

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION

.
OHIO A. PHILIP RANDOLPH . Case No. 1:18-cv-357
INSTITUTE, et al., .
 . **Day 3 of Bench Trial**
Plaintiffs, .
 .
- v - .
 . Wednesday, March 6, 2019
LARRY HOUSEHOLDER, et al., . 8:58 AM
 .
Defendants. . Cincinnati, Ohio
.

- - -

TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE TIMOTHY S. BLACK, THE HONORABLE KAREN
NELSON MOORE AND THE HONORABLE MICHAEL H. WATSON, JUDGES

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P R O C E E D I N G S

(In open court at 8:58 AM.)

JUDGE BLACK: Good morning. Please be seated. A couple of minutes of 9:00.

We are back in the open courtroom on *Ohio A. Philip Randolph Institute, et al. versus Larry Householder, et al.*

Plaintiffs' counsel is here. Defense counsel is here. Intervenor's counsel is here.

Intervenor's counsel is standing. Do you require the Court's attention?

MS. McKNIGHT: Yes. Good morning, Your Honor, and thank you.

There is one administrative cleanup issue I need to deal with with the Court regarding three exhibits from yesterday.

JUDGE BLACK: Okay.

MS. McKNIGHT: I've spoken with plaintiffs' counsel about this issue. The exhibits I'm talking about are I25, I27 and I31. Yesterday, intervenor's moved for the admission of those exhibits. Plaintiffs lodged objections. The Court stated that the objections were noted but did not resolve admission, and I understand that for the record we need to hear from the Court the magic words "admitted conditionally" or some similar phrase so that we know that we need to resolve the objections at a later date.

THE COURT: Does the plaintiff wish to be heard?

1 MR. FRAM: Your Honor, that's our understanding also.
2 We are working out a briefing schedule on the post-trial issues
3 on admissibility. We hope to run through all that pretty
4 quickly. But as long as it's understood that our objections
5 are not waived, we do not have any trouble if that's the
6 language the Court wants to use about these sorts of exhibits.

7 JUDGE BLACK: 25, 27 and 31?

8 MS. McKNIGHT: Intervenors', correct, Your Honor.

9 JUDGE BLACK: All right. Admitted conditionally.
10 Did you hear the magic words?

11 MS. McKNIGHT: Yes. Thank you, Your Honor.

12 (Intervenors' Exhibits 25, 27 and 31 were conditionally
13 admitted.)

14 JUDGE BLACK: Yes, sir.

15 MR. STRACH: Good morning, Your Honor. I just wanted
16 to note for the Court, we're pleased to let the Court know that
17 we have an agreement on the time from yesterday. Yesterday's
18 time for the plaintiffs' was 262 minutes, for a total time for
19 the plaintiffs so far of 436 minutes. Yesterday's time for the
20 defendants, and intervenors of course, was 104 minutes, for a
21 total time of 275 minutes.

22 THE COURT: And the plaintiff agrees?

23 MR. FRAM: Your Honor, we can't top what Mr. Strach
24 just said. We agree.

25 JUDGE BLACK: Very well. It's a credit to you. We'll

1 note that as such.

2 Are we ready to ask the witness to retake the stand, from
3 the plaintiffs' perspective?

4 MS. THOMAS-LUNDBORG: Yes, Your Honor.

5 JUDGE BLACK: Very well. Defense as well?

6 MR. STRACH: Yes, Your Honor.

7 JUDGE BLACK: And the intervenors?

8 MR. LEWIS: Yes, Your Honor.

9 JUDGE BLACK: Very well. Is the witness available?
10 If you'd be willing to approach the stand, sir.

11 (Christopher Warshaw resumes the witness stand.)

12 JUDGE BLACK: You are still under oath; you
13 understand?

14 THE WITNESS: Yes.

15 JUDGE BLACK: You may be seated.

16 Counsel can begin when you're ready.

17 MS. THOMAS-LUNDBORG: Your Honor, may I approach the
18 witness? I believe he needs a copy of the binder.

19 JUDGE BLACK: Yes. Thank you.

20 CHRISTOPHER WARSHAW

21 a witness herein, having been previously duly sworn, testified
22 further as follows:

23 DIRECT EXAMINATION (Continued)

24 BY MS. THOMAS-LUNDBORG:

25 Q. Dr. Warshaw, if you'll recall yesterday we were talking

1 about some of the data that you produced in this case.

2 A. Yes.

3 Q. And your data was produced in R; is that correct?

4 A. That's correct.

5 Q. And what is R?

6 A. It's an open-source software program commonly used by
7 political scientists, economists, and scientists more
8 generally, as well as increasingly in industry to conduct
9 statistical analysis.

10 Q. And did you include your elections data source in R?

11 A. Yes.

12 MS. THOMAS-LUNDBORG: If we could put up P474. P474
13 is a Plaintiffs' Exhibit. It was produced natively, as the
14 slipsheet indicates.

15 If we could please put up the native file. And if we could
16 scroll through the native file. And keep scrolling just to the
17 end to get a sense of size.

18 Q. Does this native file appear to be your election data that
19 you discussed?

20 A. Well, if you scroll to the top -- if you go back to the
21 top, I think this is the DW-- this is actually the DW-Nominate
22 data --

23 Q. Great.

24 A. -- that's on the ideology of members of Congress.

25 Q. And that was produced in R?

1 A. Exactly. Well, I produced a data file and then R code in
2 order to work with it.

3 Q. Great.

4 MS. THOMAS-LUNDBORG: If we could -- and the
5 plaintiffs move in P74.

6 UNIDENTIFIED MALE SPEAKER: 474.

7 MS. THOMAS-LUNDBORG: Sorry. 474.

8 JUDGE BLACK: Any objection?

9 MR. STRACH: No objection.

10 JUDGE BLACK: It's admitted.

11 MR. LEWIS: No objection.

12 (Plaintiffs' Exhibit 474 was admitted.)

13 MS. THOMAS-LUNDBORG: Okay. If we could put up P504.
14 And this has the slipsheet that says this document was also
15 produced natively. If we could open the native file.

16 Q. Does this appear to be a copy of some of the R code that
17 you said that you ran?

18 A. Yes, it is.

19 Q. And when you run the R code, what's the output of the R
20 code?

21 A. Well, it outputs all of the tables, figures and analyses
22 that I use in my report, that I show in my report.

23 MS. THOMAS-LUNDBORG: Plaintiffs move to admit P504.

24 JUDGE BLACK: Any objection?

25 MR. STRACH: Not from the defendants.

1 MR. LEWIS: None from intervenors.

2 JUDGE BLACK: They're admitted. It's admitted.

3 (Plaintiffs' Exhibit 504 was admitted.)

4 MS. THOMAS-LUNDBORG: If we could put up P507. P507
5 was also produced natively. If we could publish the native
6 file.

7 Q. Is this also a copy of your R code?

8 A. Yes, it is.

9 MS. THOMAS-LUNDBORG: Plaintiffs move in P507.

10 JUDGE BLACK: Any objection?

11 MR. STRACH: None from the defendants.

12 MR. LEWIS: None from intervenors.

13 JUDGE BLACK: P507's admitted.

14 (Plaintiffs' Exhibit 507 was admitted.)

15 Q. And you mentioned a moment ago that when you run the R code
16 you get tables.

17 MS. THOMAS-LUNDBORG: Plaintiffs would like to publish
18 P -- and if you'd bear with me for a minute -- 575 -- I mean
19 475, excuse me. This was also produced natively.

20 Q. This document, it's titled P475, which is the exhibit
21 number. The native title is "Declination Data."

22 When you run the R code, do you get, for example, Excel,
23 such as this?

24 A. You do. I would note, though, this is actually Professor
25 Warrington's declaration data that I used to validate mine.

1 Q. Thank you.

2 A. The tables that I output look exactly like this.

3 MS. THOMAS-LUNDBORG: Plaintiffs move in 475.

4 JUDGE BLACK: Any objection?

5 MR. STRACH: None here, Your Honor.

6 MR. LEWIS: None, Your Honor.

7 JUDGE BLACK: It's admitted.

8 (Plaintiffs' Exhibit 475 was admitted.)

9 Q. And then one last document --

10 JUDGE WATSON: It's 475 or 575?

11 MS. THOMAS-LUNDBORG: 475 is the last one.

12 -- which is P570.

13 Q. When you print an Excel spreadsheet, does it look something
14 similar to that?

15 A. Yes, it does.

16 Q. Okay. And this is a copy of numbers that were run for your
17 mean median?

18 A. Exactly. This looks like the output of some of my code.

19 MS. THOMAS-LUNDBORG: Okay. Plaintiffs move in 570.

20 JUDGE BLACK: Any objection?

21 MR. STRACH: No, Your Honor.

22 MR. LEWIS: No, Your Honor.

23 JUDGE BLACK: It's admitted.

24 (Plaintiffs' Exhibit 570 was admitted.)

25 Q. Okay. Let's go back to your -- if we could go back to your

1 October report, which is Exhibit 571.

2 And it is tab 1, for folks following along in paper, and
3 page 16. If we could look at Figure 2.

4 What does Figure 2 show?

5 A. Well, this shows the vote-seat curve that I calculated for
6 Ohio based on its 2012 election results. So what I did is, I
7 applied uniform swings to the actual election results where I
8 think we discussed earlier Democrats received 47 or 48 percent
9 of the vote in the actual election at the statewide level. So
10 I applied uniform swings to swing that from 20 percent all the
11 way to 80 percent. And the -- so that's what the X axis shows.

12 The Y axis shows the share of the seats that Democrats
13 received for each vote share. So just as an example, in the
14 upper right corner of the graph, it indicates that if Democrats
15 had received 80 percent of the statewide vote, they would have
16 received a hundred percent of the seats. Conversely, if they
17 received 20 percent of the vote they only would have won one
18 seat.

19 The interesting part of the graph is the blue area in the
20 middle. So the blue area in the middle, it shows the range of
21 vote shares that Ohio has actually seen over the last two
22 decades, where Democrats received somewhere between 41 or 42
23 percent of the statewide two-party vote share and around 52
24 percent of the statewide vote share.

25 Q. And just to walk through the -- what this exhibit shows --

1 sorry, just to walk through what this exhibit shows, when
2 Democrats are projected to get 50 percent of the vote, how many
3 seats are they projected to get here?

4 A. So it shows that if they received 50 percent of the vote
5 they only receive 25 percent of the seats.

6 Q. And then 51 percent of the vote?

7 A. Still only 25 percent of the seats.

8 Q. Okay. And then when is the first time in this figure that
9 Democrats would gain an additional seat?

10 A. When they receive about 52 percent of the vote they would
11 get one more seat.

12 MS. THOMAS-LUNDBORG: If we could publish Exhibit 476.
13 And that is tab 3 on page 12, Figure 8.

14 Q. What does this figure show?

15 Sorry. I'll let the witness get there.

16 A. This shows the same graph using 2018 election results
17 rather than 2012 election results.

18 Q. Now, there appears to be some difference between the 2012
19 and 2018 results. Can you explain what that is?

20 A. Sure. Well, there's modest differences between the graphs,
21 but I'll start first with what's exactly the same. So this
22 indicates that just like based on the 2012 election results, if
23 Democrats get between about 42 and 50 percent of the statewide
24 vote across an entire range of vote shares, they still only
25 receive 25 percent of the vote. However, based on the 2018

1 results, now it looks like if Democrats get to 51 percent of
2 the vote, they pick up two more seats. And they keep -- and
3 they would stay with 37 and a half percent of the vote all the
4 way up to 53 percent of the statewide vote. And they don't get
5 to half the seats until they get 55 percent of the statewide
6 vote.

7 Q. Thank you.

8 A. And I'll just note the Democrats, as the blue -- as the
9 blue rectangle shows, Democrats have never actually received 55
10 percent of the vote in recent Ohio elections.

11 Q. Now, we discussed yesterday that this analysis is related
12 to responsiveness and competitiveness of Ohio's elections, and
13 we spent some time talking about partisan bias.

14 Is there any relationship between competitiveness or
15 responsiveness of districts in partisan bias?

16 A. Well, I think these are two different concepts, but the
17 idea behind the competitiveness and responsiveness measures is
18 that a party conducting a gerrymander would try to lock in
19 partisan bias, would try to insulate it against swings and
20 voter preferences by having an uncompetitive or unresponsive
21 map.

22 MS. THOMAS-LUNDBORG: If we could publish Exhibit 572,
23 which is tab 2, page eight, Figure 1.

24 Q. What does this figure show?

25 A. So this figure shows the relationship between the

1 efficiency gap, which to remind everyone is one of the measures
2 that I use -- one of the metrics that I use to measure partisan
3 advantage in the districting process.

4 So one of the critiques that someone made of the efficiency
5 gap is that in order to achieve a neutral efficiency gap, you
6 might have -- mapmakers might create uncompetitive elections or
7 uncompetitive districts. But what this graph shows is that,
8 empirically, there's essentially no relationship between the
9 efficiency gap and the percentage of competitive elections in a
10 state.

11 Q. If we could move to page nine in the same exhibit, and
12 Figure 2, please. What does Figure 2 show?

13 A. So this is the exact same graph, but it uses three of the
14 other metrics that I show -- that I analyze in my report: The
15 declination, the mean median, and symmetry. And, again, it
16 analyzes a relationship between the absolute value of these
17 metrics. So, in other words, if there's more partisan
18 advantage in the districting process, how does that affect the
19 number of competitive elections?

20 And, in general, what it indicates for these metrics is,
21 actually, that more partisan bias in the districting process
22 leads to fewer competitive elections; whereas, more neutral
23 maps actually increase the number of competitive elections.

24 So I think looking across the different metrics, what I
25 would conclude is that there's somewhere between little to no

1 relationship between partisan bias and competitiveness, and
2 potentially, actually, that more biased maps decrease
3 competitiveness. So I think, in general, this concern is
4 unfounded.

5 Q. Thank you. If we could go back to Exhibit 571. And we
6 don't have to publish any specific page at this point, but I
7 believe in section seven of your report you discuss durability.

8 A. Yes.

9 Q. What is durability?

10 A. Well, durability is the idea that how -- how likely is it
11 that a particular level of partisan bias in the first election
12 after a redistricting will endure through the rest of the plan.

13 So to analyze that, I look at the relationship between the
14 efficiency gap declination and the other metrics that I look
15 at, in 2012, which, again, is the first election after the
16 redistricting plan went into place, and the elections in 2016
17 and then also in 2018, in my most recent report.

18 Q. Okay. Let's now go to that section. I believe it is on
19 page 30 of your report. Now, I believe you measured durability
20 two ways. You ran correlation; is that correct?

21 A. Yes. I think I actually did three ways.

22 Q. Okay.

23 A. So the first is I just looked at the correlation between
24 the various metrics in 2012 and 2016, and I found that they're
25 all highly correlated with each other. So it's not the case

1 that the various metrics are kind of changing in random ways
2 between the elections.

3 Second, I looked at -- statistically, I analyzed, well, how
4 big are the metrics in 2016 compared to the size in 2012? And
5 what I found is that they're somewhere between about 60 and 80
6 percent as large as they were in 2012, which I view as being,
7 you know, quite a large and robust relationship that indicates,
8 looking across the nation as a whole, these maps are quite
9 durable.

10 Q. And is that the analysis that you just discussed the
11 regression analysis?

12 A. It is. So that's -- I'm sorry. That's reported in Table
13 6.

14 Q. Thank you. And you said you ran it across the nation as a
15 whole. So these aren't Ohio's numbers, these are across the
16 whole data set?

17 A. Exactly. This is looking across all elections across the
18 country between 2012 and '16.

19 And then the third one I was going to discuss is looking at
20 Ohio, specifically. So I actually compared just the raw values
21 for all of the metrics in Ohio between 2012 and 2016, and
22 looking across all of them, in general, they were similar.
23 There was some more decay in some compared to others, but
24 looking across all the metrics they're similar in 2016 compared
25 to what they were in 2012.

1 Q. Now, we're looking at the 2016 numbers. If we could go to
2 the 2018 numbers, which are in Exhibit 476 on page 11. That's
3 the third tab. And what did you find with the 2018 numbers?

4 A. So, once again, I found that the 2018 numbers were highly
5 correlated with the metrics in 2012, and they're about 60 to 80
6 percent as large as the metrics were in 2012. So again, it's
7 not the case that these metrics are either bouncing around
8 randomly or decaying all the way to being sort of neutral or
9 unbiased metrics over the course of the redistricting cycle.

10 And then, finally, all of the metrics for Ohio look fairly
11 similar between 2012 and 2018.

12 Q. If we could look at Plaintiff Demonstrative Exhibit 75.
13 Sorry. 74. Now, when you say all of the metrics for Ohio are
14 fairly similar, is that when you look at the chart of the
15 metrics?

16 A. Exactly. So I was talking specifically about the partisan
17 bias metrics, looking at the first five columns. So if you
18 compare, for instance, the efficiency gap in 2018 to the
19 efficiency gap in 2012, they're almost identical. The mean
20 median is a little bit smaller, but also still shows a robust
21 Republican advantage. The declination is nearly identical in
22 2018 and 2012. Both symmetry metrics are nearly identical.

23 So looking across all of the metrics, what I would conclude
24 is that they've been quite durable across this entire
25 redistricting cycle, and, thus, are unlikely to go away on

1 their own without any kind of intervention into the map.

2 Q. Thank you. Now, in addition to conducting analysis on the
3 actual plan, did you also conduct analysis on the plaintiffs'
4 proposed remedial plan?

5 A. I did.

6 Q. And if we could go to your report, 476, page 15, Table 2.
7 What does Table 2 show?

8 A. So in Table 2 I analyze the partisanship of each district
9 in the plaintiffs' remedial map based on aggregating out
10 precinct level data from the 2012, '16 and '18 House elections
11 and the 2012 and '16 presidential elections.

12 Q. And how did you treat uncontested elections to generate
13 your analysis?

14 A. I imputed the results in those elections using the same
15 statistical model that I used in the rest of my main report.

16 Q. If we could look at Table 3 on the same page, please. What
17 does Table 3 show?

18 A. So here, once again, I calculated -- I took the data that
19 we just showed you in Table 2, and I calculated each of the
20 metrics of partisan bias or advantage in a districting plan for
21 the remedial map using these five election sources, so using
22 the 2012, '16 and '18 House elections and the 2012 and '16
23 presidential elections. And, of course, that's a lot of
24 numbers to throw at you or you're going to throw at me. So on
25 the last column on the right, I calculated the average across

1 all of those different election sources, and I think that's
2 what we should really focus on.

3 Q. And what did you conclude based on this table?

4 A. Well, looking across all of the different metrics, there's
5 very little partisan bias in the remedial map. There's still a
6 very small Republican advantage that may reflect the underlying
7 geography of Ohio, but all of those metrics are relatively
8 close to zero and are certainly not historical outliers.

9 Q. I'd like to shift gears a little bit away from a lot of the
10 metric-heavy part of your testimony and talk a little bit about
11 polarization and how you treated popularization in your report.

12 The last section of 571 of your report is on polarization;
13 is that correct?

14 A. Yes.

15 Q. And why did you include this section?

16 A. Well, in order to analyze, in order to understand the
17 effect of gerrymandered elections on representation on the --
18 what happens in our government, I think you have to put it --
19 line it up side by side with the growing polarization in
20 Congress. And this growing polarization means that
21 representatives in Congress nearly always vote in ideologically
22 extreme ways with their party. So voters that face severe bias
23 against their party in the translation of votes to seats don't
24 have their views fairly represented in Congress. And if it
25 weren't for polarization, then it may be the case that

1 gerrymandering wouldn't be such a big deal for the
2 representation that voters receive, but when you put
3 gerrymandering and polarization together, it has large and
4 pernicious consequences for representation.

5 Q. And I think we discussed this a bit yesterday, but since
6 that was many hours ago, do political scientists study
7 polarization?

8 A. Yes. This is a large topic of study for political
9 scientists.

10 Q. And what is political -- what has political science said
11 has happened to polarization in the last decades?

12 A. Well, at both the elite and mass level, but particularly at
13 the elite level in Congress, polarization has grown
14 dramatically. In other words, the distance between the
15 ideological -- the average ideological positions of Democrats
16 and Republicans in Congress has grown quite substantially.

17 MS. THOMAS-LUNDBORG: If we could publish Exhibit 571,
18 page 35. Page 35, yeah. And we can publish this figure
19 together. Okay.

20 Q. So let's start at the top. What does Figure A show?

21 A. So Figure A shows the DW-Nominate score for every single
22 member of Congress over the last 45 years or so.

23 Q. And if you could, remind everyone what DW-Nominate is.

24 A. Of course. So DW-Nominate is the most commonly used metric
25 of the roll -- of the ideological manifestations of

1 legislators' roll call voting behavior in Congress; in other
2 words, how liberal or conservative they are. This has been
3 used by hundreds if not thousands of political science
4 articles.

5 Q. And what does the DW-Nominate score in A indicate?

6 A. Well, each dot here, as I just explained, represents a
7 different member of Congress, and the red dots are Republicans
8 and the blue dots are Democrats. And what it indicates is that
9 in the 1970s, on average, certainly there is a difference
10 between Democrats and Republicans, but there was a lot of
11 overlap between the parties. So it could have been that in a
12 competitive district the ideological positions of Democrats and
13 Republicans might not have been all that different from each
14 other.

15 But in the modern era, if we fast-forward all the way to
16 2016, and the most recent -- well, I guess two Congresses ago
17 now, there's a massive difference between Democrats and
18 Republicans. There's no overlap between the parties, which you
19 can see from the white space between the red and blue dots.
20 The most moderate or conservative Democrat is still far more
21 liberal than the most moderate Republican.

22 And then if you turn to the bottom panel, this shows the
23 average difference between the parties. And what it indicates
24 is that over the last 40 years, the difference between the
25 parties has grown about 50 percent, which is obviously quite a

1 large growth.

2 Q. And is this figure for the whole Congress, both Ohio and
3 all the other states?

4 A. Correct. This shows members of Congress from across the
5 country.

6 MS. THOMAS-LUNDBORG: If we could go to page 37. And
7 if we could -- yes.

8 Q. What does Figure 15 show?

9 A. So this shows the exact same DW-Nominate ideology scores
10 for members of Congress from Ohio. And it indicates that in
11 Ohio, just like in the country as a whole, there's no overlap
12 between the ideological positions of Democrats and Republicans,
13 and over the last 40 years the gap between the parties has
14 grown enormously.

15 Q. If we could go to Table 9 on page 38. What does this table
16 show?

17 A. So this shows the relationship between the efficiency gap,
18 which, again, is one of the metrics of partisan bias that I
19 use, and the role call voting behavior or the ideology of
20 members of Congress. And the reason that I do this analysis is
21 that one way of thinking about the growing consequences of
22 gerrymandering is, essentially, what gerrymandering does at a
23 simple level is it means that, in Ohio, Republicans are more
24 likely to get elected than Democrats. And then, increasingly,
25 as Republicans take more conservative positions relative to

1 Democrats, what that means is that, in a gerrymandered state
2 like Ohio, you're going to have more and more conservative --
3 if it's a Republican advantage, there will be more conservative
4 members of Congress elected.

5 So what this shows is that there's a large relationship
6 between the efficiency gap and the ideological positions of
7 members of Congress. And then in the right column here I show
8 that that effect is growing substantially over time, just as we
9 would expect, based on the going polarization in Congress.

10 Q. Now, the next section, subsection of your report deals with
11 the Affordable Care Act. Why did you look at the Affordable
12 Care Act?

13 A. Well, the Affordable Care Act is probably the most salient
14 political issue over the last decade. It was the largest most
15 important legislative priority for Democrats in 2009 and '10
16 when President Obama took office, and then repealing the
17 Affordable Care Act was the most important priority for
18 Republicans really ever since then.

19 Q. And what did you find in your analysis of the Affordable
20 Care Act?

21 A. Well, what I looked at is -- is I compared survey data on
22 the mass public's views on the Affordable Care Act to how their
23 legislators voted on an effort to repeal the Affordable Care
24 Act. And what I found is that citizens are much more likely to
25 agree with a member of Congress from their party. Most

1 Democrats favored keeping the Affordable Care Act, just as most
2 Democrats in Congress did, and most Republicans in the public
3 thought that we should repeal the Affordable Care Act, just
4 like most Republicans in Congress.

5 So in states with a large partisan bias in the
6 redistricting process, which here I use the efficiency gap to
7 show, if we turn to Figure 16 on page 40, what I found is that
8 in states with a pro-Republican advantage in the efficiency
9 gap, Democrats were much less likely to agree with their member
10 of Congress' position on the Affordable Care Act than
11 Republicans were, whereas in states with a pro-Democratic
12 efficiency gap, Republicans were a lot less likely to agree
13 with their member of Congress. And that's what the lines on
14 this graph show. These are averaging across all states.

15 Q. And what happens when the efficiency gap is zero?

16 A. So when the efficiency gap is zero, when there's no
17 political partisan bias in the redistricting process, Democrats
18 and Republicans are about equally likely to agree with their
19 member of Congress, which I think from the point of view of
20 someone who studies representation, it's exactly what we should
21 want to see. So my conclusion is that in states with a large
22 partisan bias in the redistricting process, this degrades the
23 representation that citizens receive from members of Congress.

24 Q. Okay. If we could look at Figure 17 on page 42. Now, in
25 addition to looking at the Affordable Care Act and surveys

1 regarding the Affordable Care Act, what does Figure 17 show?

2 A. So the next thing I did in addition to trying to analyze
3 the relationship between gerrymandering and the representation
4 that citizens received in Congress, I wanted to see if it also
5 degraded citizens' trust in their representatives. And so to
6 do that I used a survey from 2014 called the Cooperative
7 Congressional Election Study which, as we discussed earlier, is
8 a large scale, widely-used survey of the American public. And
9 I calculated the percentage of people in each state that trust
10 their representative to do what's right. And what I found is
11 that in states with a large efficiency gap, like Ohio, citizens
12 are much less likely to trust their representative to do what's
13 right than in a state like Washington or Minnesota or
14 California where there's little bias in the redistricting
15 process.

16 So overall, this suggests to me that the redistricting
17 process has a large and profound effect on citizens' trust in
18 their representatives.

19 Q. And is Ohio indicated on this figure?

20 A. Yes. Just like in my other graphs, all the dots here show
21 an individual state, and the lower right shows Ohio. So what
22 you can see is that Ohio has some of the lowest trust in their
23 representatives in the country, and, of course, also has one of
24 the most -- the largest partisan bias in the map.

25 Q. And what was your overall conclusion based on the analysis

1 that you did of polarization and partisan bias?

2 A. I think that gerrymandering and partisan bias in the
3 redistricting process has profound and pernicious consequences
4 both on the representation that citizens receive, as well, as
5 their trust in government, which suggests to me that
6 gerrymandering contribute -- or undermines citizens' faith in
7 government and indeed their faith in democracy.

8 MS. THOMAS-LUNDBORG: I have no further questions at
9 this time.

10 CROSS-EXAMINATION

11 BY MR. LEWIS:

12 Q. Good morning, Professor Warshaw. I'm Patrick Lewis on
13 behalf of the intervenors. I believe we've met before.

14 Now, Professor Warshaw, you're familiar with the
15 traditional redistricting principles recognized in the field of
16 political science; are you not?

17 A. Yes, at a broad level.

18 Q. Would you agree, for example, that keeping communities of
19 interest together is a traditional redistricting principle?

20 A. Well, I think that's a -- yes, I would agree that's a
21 traditional principle used for legal purposes. I don't think
22 it's one that political scientists typically focus on, though.

23 Q. And would you agree that the preservation of cores of
24 existing districts from one districting plan to the next is a
25 traditional redistricting principle?

1 A. Yes.

2 Q. Okay. And would you agree that preserving cores of
3 existing districts can help provide continuity of
4 representation between voters and their members of Congress?

5 A. Yes. I think that's one factor that can do so.

6 Q. And would you agree that the preservation of cores of
7 districts is particularly important in a situation where a
8 state loses seats in Congress in a redistricting cycle from one
9 to the next?

10 A. I don't have an opinion about that.

11 Q. Would you agree that incumbency protection is a traditional
12 redistricting principle?

13 A. Yes. I think that's a commonly used redistricting
14 principle.

15 Q. And as someone that studies Congress, would you agree that
16 the more senior a representative in Congress becomes, the more
17 influential that member of Congress becomes?

18 A. Generally speaking, yes.

19 Q. And would you also agree with me that the more senior and
20 influential a member of Congress becomes, the more -- the
21 greater their ability to provide benefits to their home state
22 becomes as well?

23 A. Again, generally, yes, but I think the literature on that
24 is, actually, not entirely clear. It looks like the main
25 finding of the literature is, in general, the kind of people

1 who are good at getting benefits to their district are always
2 good at it and it doesn't change very much with seniority or
3 with committee status.

4 Q. But at the least you'd agree with me, surely, that having
5 the speaker of the U.S. House of Representatives be from your
6 state is probably good for that state; right?

7 A. Yes.

8 Q. Okay. And you're familiar with the Voting Rights Act, are
9 you not?

10 A. At a broad level, not at a -- I'm not familiar with all the
11 legal details of it.

12 Q. And you would agree with me that compliance with the Voting
13 Rights Act has become, since the passage of the Voting Rights
14 Act, a redistricting principle that redistricting authorities
15 need to be concerned with?

16 A. Yes.

17 Q. I'd like to turn to your discussion about the metrics of
18 partisan bias that you use in your report. First, I had a few
19 questions about sort of the theory underlying your approach.

20 So to start, it's fair to say that you view gerrymandering,
21 partisan gerrymandering specifically, as being accomplished
22 through the use of packing and cracking voters; right?

23 A. Yes, I think that's the main tool that mapmakers use to
24 conduct gerrymandering.

25 Q. And do you recall yesterday defining cracking as a process

1 where the redistricting authority draws plans with a number of
2 districts with a narrow majority of the favored party in them?

3 A. Yes.

4 Q. Okay. How do you define "narrow"?

5 A. Generally, fewer -- less than 60 percent, but I don't think
6 there's a -- one clear bright line, but I think, qualitatively,
7 when I think of it, that's kind of how I think of it.

8 Q. All right. So a 60 to 40 district you would view as a
9 narrow majority?

10 A. Yes. I think that if a party were to win a large number of
11 districts by -- with a vote share of less than 60 percent, then
12 that would be a very efficient map.

13 Q. And what do you base your opinion that --

14 That 60 percent figure you just used, what's your basis for
15 that number?

16 A. As I said, there's a qualitative judgment. I don't think
17 there's any bright line in the political science literature on
18 exactly what constitutes a cracked district.

19 Q. And have you attempted to empirically study the line at
20 which that district would become -- that majority would become
21 narrow, in your view?

22 A. No.

23 Q. Do you recall yesterday defining packing as the process of
24 drawing a limited number of districts where the disfavored
25 party wins by -- I think the term you used was an overwhelming

1 majority?

2 A. Yes.

3 Q. And do I recall that you gave 80 percent as that number
4 that would constitute an overwhelming majority?

5 A. Well, that was an illustrative figure. I didn't mean that
6 to be a bright line.

7 Q. Do you have a bright line?

8 A. I don't. I don't have a bright line on packing in my head.

9 Q. And have you attempted to study for this, empirically
10 analyze for this case where a line might be drawn when a party
11 wins an overwhelming majority?

12 A. I have not.

13 MR. LEWIS: I'd like to pull up Plaintiffs'
14 Demonstrative Exhibit 72. Okay. And I think we have -- this
15 is page three or should be page three of Plaintiffs'
16 Demonstrative 72.

17 Q. Do you recall this chart from yesterday, Professor Warshaw?

18 A. Yes.

19 Q. Great. And this chart depicts the winning vote share for
20 each of Ohio's 16 congressional districts from 2012 to 2018;
21 correct?

22 A. Correct.

23 Q. Of the 16 districts in Ohio, how many districts do
24 Democrats win by 80 percent or more?

25 A. The 11th District.

1 Q. Any others?

2 A. No.

3 Q. How many times have Democrats won the 11th Congressional
4 District by 80 percent or more?

5 A. Well, twice, but it was uncontested in 2012 and likely
6 would have been won by 80 percent or more.

7 Q. Now, for your analysis in this case, though, we have an
8 uncontested race. Isn't it true that you impute a 75 to 25
9 percent split to that district?

10 A. No, it's not, actually. I use a complicated statistical
11 model -- it's described in depth in my report -- to impute the
12 results based on the presidential results as well as past and
13 future congressional results in that district. So I don't use
14 the 75/25. I use that as a robustness check for my result. I
15 don't use it in my main report.

16 Q. Okay. And in your report do you identify what value you
17 imputed to the 11th Congressional District in 2012?

18 A. No. But we could certainly look it up in the data that I
19 provided.

20 Q. All right. Now, another concept that you discussed
21 yesterday was, you know, the concept that the people that are
22 being packed and cracked are the -- you used the term
23 "disadvantaged party," and then a related term, "disadvantaged
24 party supporters." Do you recall that?

25 A. Yes, I do.

1 MS. THOMAS-LUNDBORG: Sorry.

2 JUDGE BLACK: Yes, I'm sorry.

3 MS. THOMAS-LUNDBORG: I just want to have a standing
4 objection to some of the characterization of testimony
5 yesterday. Somewhat at a disadvantage in that it was
6 yesterday, but I believe that some of the testimony has been
7 characterized incorrectly.

8 JUDGE BLACK: Don't be mischaracterizing the
9 testimony. The objection is noted.

10 Q. And, Professor Warshaw, in fact, you talk about
11 disadvantaged party and disadvantaged party supporters in your
12 report; do you not?

13 A. Yes.

14 Q. Okay. How do you define disadvantaged party supporters?

15 A. Well, the disadvantaged party supporters are one where
16 they're not the party that controlled the redistricting process
17 and they are a party that faces a large disadvantage in the
18 translation of votes to seats, just like we've seen in Ohio.

19 Q. And when you talk about the disadvantaged party supporters,
20 who are the supporters?

21 A. People that vote for candidates from that party.

22 Q. And how does one identify who the disadvantaged party
23 supporters are?

24 A. Well, of course, there's no way based on election results
25 to identify them at the individual level because of the secret

1 ballot in the United States. You could ask them on a survey
2 which candidates they supported, and then we could identify
3 them at the individual level. Or we could identify, sort of at
4 the aggregate level, we could identify the percentage of people
5 in each locality that were supporters of each party.

6 Q. Okay. And, in particular, is it fair to say that you don't
7 rely on party registration in your analysis in this case?

8 A. That's right. I don't rely on party registration in this
9 case or any case, because I think party registration is almost
10 always a very noisy indicator of which party you support.

11 Typically, people register with a party as a, you know, as a
12 teenager or a 20-something and then don't update it over time.

13 Q. Okay. So does that suggest then that someone could
14 register as a Republican, but, over time, become a Democrat?

15 A. Sure. Over the course of their lifetime somebody might
16 slowly switch.

17 Q. Now, based on that election data that you referred to, at
18 what level -- you know, how do you determine how many times
19 does somebody have to vote for a Democratic candidate before
20 your analysis would score them as a supporter of the Democratic
21 party?

22 A. I don't think I've thought about that question.

23 JUDGE BLACK: Counsel for plaintiff wish to be heard?

24 MS. THOMAS-LUNDBORG: Just objection to the
25 characterization of his analysis.

1 JUDGE BLACK: The objection is noted.

2 Q. Specifically, what election data -- and I understand that
3 you can't -- we can't tell how any specific voter votes because
4 of the secret ballot and other factors that you've identified.
5 But for your analysis, what election data do you leverage to
6 attempt to determine, you know, where a disadvantaged
7 supporter -- disadvantaged party supporters might reside?

8 A. I wasn't asked to do that in this case.

9 JUDGE BLACK: Excuse me.

10 MS. THOMAS-LUNDBORG: Objection to vagueness. If
11 there's a particular analysis in which counsel is referring to.

12 JUDGE BLACK: The objection's noted. Counsel can
13 respond or not in terms of further questions.

14 MR. LEWIS: Okay.

15 Q. So, Professor Warshaw, for each district, and we'll start
16 with efficiency gap and we'll expand it from there, you measure
17 election performance based on the congressional districts
18 themselves; correct?

19 A. That's correct, based on the congressional elections
20 themselves.

21 Q. Okay. And why did you make the choice to use congressional
22 election return data as opposed to some other form of data?

23 A. Well, the target of a gerrymander is the legislative
24 elections, so in this case I was asked to analyze the partisan
25 bias in the Ohio congressional election. So it made sense to

1 focus on the elections that were the target of the gerrymander,
2 which is congressional elections. And then I use presidential
3 election data just to impute the congressional elections, but I
4 think that was a theoretical choice I made. But in the modern
5 era, it doesn't matter very much. You could have used
6 presidential results or any other statewide results and it
7 would yield very similar answers. Because the voters are
8 cleanly sorted into parties and they typically vote the same
9 way for different offices, the correlation between
10 congressional election results and presidential election
11 results is about .9. So they're extremely highly correlated.

12 Q. Now, for the mean-median metric do you also rely on
13 congressional election return data to perform your mean median
14 analysis?

15 A. I do.

16 Q. I'll ask you the same question for the declination. Do you
17 use congressional election return data for the declination?

18 A. Yes.

19 Q. And for your two measures of partisan symmetry, same
20 answer?

21 A. Yes.

22 Q. Okay. And do you use that congressional election return
23 data for all five of your partisan metrics for the same reason
24 that you gave for the efficiency gap?

25 A. Yes.

1 Q. Now, aren't there other sources of election data that you
2 could have used for your analysis, like, for example, statewide
3 races?

4 A. Well, I could have used the presidential election returns,
5 because those are available for all 50 states, historically, at
6 the congressional district level. I could have used other
7 statewide results. And what I found, again, is that those were
8 almost perfectly correlated with congressional results, so it
9 doesn't matter what you use.

10 In the case of Ohio, I could have used other statewide
11 results like governors' races or something. I would expect it
12 would yield very similar results. You couldn't actually do the
13 historical analysis that lies at the heart of my report for
14 those other races because there's not data on governors'
15 elections by congressional district going back in time for all
16 50 states. So we simply lack the data to conduct a full
17 analysis using other statewide races.

18 Q. Now, Professor Warshaw, are you aware of what election
19 data -- have you studied how the Ohio legislature used election
20 data in connection with evaluating proposed districting plans
21 back in 2011?

22 A. No.

23 Q. Are you aware of what election data the Republican caucuses
24 of the Ohio General Assembly used when evaluating potential
25 districting plans for the 2011 congressional plan in Ohio?

1 A. No.

2 Q. Are you aware of what election data the Democratic caucuses
3 of the General Assembly used to evaluate potential plans in
4 2011?

5 A. No.

6 Q. Are you aware of what a partisan index is?

7 A. Yes. Well, I should say I'm aware of it at a broad level.
8 I don't know if I'm aware of exactly your use -- the way you're
9 referring to it in Ohio.

10 Q. Sure. In general, what do you understand a partisan index
11 to be?

12 A. Well, I think there's two ways that people use that term.
13 The way -- I think the best way to use it would be an index
14 that aggregates across multiple types of races to try to
15 produce an average of how well each party might do in each --
16 in a given constituency. Another way it's sometimes used by,
17 like, the *Cook Political Report* is based on presidential voting
18 patterns to try to produce an index for how the -- the sort of
19 partisan lean of each district.

20 Q. So, for example, if someone took a mixture of the
21 presidential election results and maybe some statewide office
22 results and averaged them together, would you consider that to
23 be a partisan index?

24 A. Yes.

25 Q. Okay. And could a partisan index be used as a source of

1 election data to perform an efficiency gap analysis?

2 A. It could, but I think there's no theoretical reason to
3 prefer that for -- if you're doing observational data as I'm
4 doing, there's no theoretical reason that you would do that
5 instead of the legislative elections themselves.

6 Q. Okay. So to be clear, for your efficiency gap
7 calculations, the only time that you used any statewide
8 election data was to impute results to uncontested races;
9 correct?

10 A. That's exactly right. But I also just -- I should say on
11 the statewide elections you're referring to, I think an
12 important thing you'd want to understand is what's the
13 relationship between state-level races and congressional
14 elections. Because if, indeed, like in the south for much of
15 this period, and I think possibly in Ohio, people vote
16 differently in down-ballot elections than they do in federal
17 elections like Congress. So that's why typically political
18 scientists focus on presidential elections as the most
19 indicative of congressional voting patterns. Usually state
20 races are less indicative of congressional voting patterns.

21 Q. So you do not calculate an efficiency gap in this case
22 using statewide data except as we already discussed for
23 imputing results in uncontested races; correct?

24 A. I think I actually did calculate it using presidential
25 voting patterns as a robustness check, and I found that it was

1 extremely highly correlated with the estimate based on
2 congressional elections, but I don't think I actually looked at
3 what those values actually were for Ohio. But, in general, I
4 found it was highly correlated with the version based on
5 congressional elections, and I think I report that in a
6 footnote somewhere in my report.

7 Q. So why not use all the election data available to you for
8 your -- or why did you not publish all the results for election
9 data available to you for your report in this case?

10 A. Well, again, I think, theoretically, the target of a
11 gerrymander is legislative elections. So that's -- when you
12 have the actual election results in front of you, that's the
13 one that makes the most sense to use. Though, again, in the
14 modern era, I wouldn't expect to get anything differently with
15 other elections, especially the other federal elections.

16 I think for assimilated maps -- so when I'm looking at the
17 remedial map, it's a little bit different, because there is --
18 the district lines are getting moved around. You could argue
19 that maybe you should use some sort of exogenous election like
20 presidential voting patterns. I don't have a clear position on
21 that, as I think I discuss in a footnote, but that's why for
22 the remedial map I reported both presidential and congressional
23 results.

24 Q. Now, if you had calculated and reported results for your
25 efficiency gap analysis using that statewide -- those statewide

1 numbers, then the Court would have had available to it more
2 information to decide whether using that congressional data was
3 reasonable; isn't that correct?

4 A. Sure. I think, you know, I could have done that just for
5 Ohio and didn't for space reasons, but, again, the data would
6 be unavailable for other states. So even if we could do it for
7 Ohio, it would be difficult to construct such an index for
8 other states, which is the main reason I didn't do it in my
9 report.

10 Q. And would you agree with me that when conducting your
11 partisan bias analysis using -- and we'll start with the
12 efficiency gap. The choice of what election data you use can
13 impact the results; right?

14 A. Of course, it can impact it on the margin. But as I said,
15 when I actually looked at the relationship between the
16 efficiency gaps based on congressional results and presidential
17 results, they were extremely highly correlated with each other.
18 So on average, there certainly aren't large differences between
19 them.

20 Q. Well, you performed that correlation only using
21 presidential and only at a national level; correct?

22 A. That's correct, because that's the only data that's
23 available for congressional districts, the other partisan
24 election data at the national level.

25 Q. And so would you agree with me, then, that there's no

1 uniformly accepted way to measure the partisanship of a
2 district; right?

3 A. Yes. But I do think the most commonly used method in the
4 political science literature is what I do here, which is using
5 the legislative election results themselves. That's the
6 approach taken by Gelman and King in their seminal articles, as
7 well as most of the recent literature.

8 Q. Now, isn't it true, Professor Warshaw, that Ohio voters
9 split their tickets, and they'll vote in the same election for
10 both Democratic and Republican candidates? Isn't that true?

11 A. That's surely true in some cases, but as I discussed
12 earlier, the vast majority of voters are well sorted into
13 parties based on their ideology and typically vote similarly up
14 and down the ballot. And that's particularly true in federal
15 races.

16 Q. But you haven't studied that specifically with respect to
17 Ohio; correct?

18 A. Well, as I discussed a second ago, I found that I obtained
19 almost identical results across the country using presidential
20 and congressional election results. So given the high
21 correlation between them, I didn't find it necessary to look
22 further at Ohio.

23 Q. Now, Professor Warshaw, are you aware that in the 2018
24 gubernatorial election in Ohio that now-Governor Mike DeWine, a
25 Republican, defeated the Democrat, Richard Cordray, by a vote

1 of 50.4 to 46.7 percent?

2 A. Yes, basically. I didn't know those exact percentages, but
3 it sounds right.

4 Q. It sounds right? Okay.

5 And are you also aware that in the same general election,
6 Ohio voters reelected U.S. Senator Sherrod Brown, a Democrat,
7 who defeated the challenger, a Republican, Jim Renacci, by
8 approximately a 53 to 47 percent margin?

9 A. Yes.

10 Q. Okay. So that's a fair -- that's -- at least some
11 crossover voting had to have occurred in Ohio; correct?

12 A. Sure. And in any election it's certainly true that a
13 couple percentage of people can cross over to different
14 parties. But I would say that 90 percent of people vote
15 similarly across different elections for the same party, but
16 certainly not everyone does. That's probably how elections can
17 swing a little bit year to year.

18 Q. Okay. Now, Professor, yesterday, I believe that you
19 testified that you believe that the 2018 elections, at least
20 nationwide, constitute a wave election year for Democrats. Do
21 you recall that testimony?

22 A. I do.

23 Q. And why did you believe that last year was a wave election
24 for Democrats nationwide?

25 A. Well, at the nationwide level, as I said, I think in the

1 direct testimony, there were two rationales. One is there was
2 a large swing toward Democrats from the last few elections, but
3 I think, more importantly, Democrats received an overwhelming
4 majority of the two-party vote share in nationwide House
5 elections. I think they received 53 or 54 percent of the
6 statewide -- or of the nationwide House vote and won the House
7 vote by around eight points, which is as large as any margin in
8 recent history, and I think actually a larger vote margin than
9 the 2010 Republican victory, which is commonly considered a
10 wave.

11 Q. All right. And when you talk about that congressional
12 vote, what you're talking about is where you aggregate the
13 two-party congressional vote for all votes cast for Republican
14 candidates and all votes cast for Democratic candidates; right?

15 A. That's correct.

16 Q. Okay. Would you consider 2018 to have been a wave year for
17 Democrats in the state of Ohio?

18 A. Well, compared to the last few elections, the Democratic
19 vote share swung seven or eight points, I think, in -- the
20 two-party vote share swung seven or eight points toward
21 Democrats. And I think this was the -- Democrats received the
22 highest vote share in 2018. I think they received roughly the
23 same vote share in 2012, and it's probably 2006 or '8 is the
24 last time they received a higher vote share than in 2018.

25 Q. But Democrats didn't receive a majority of the two-party

1 vote share in Ohio in 2018, did they?

2 A. No, they didn't. I think that, you know, as we discussed
3 during -- I believe during my deposition, I think that Ohio
4 leans slightly to the right, right now. Clearly in a -- on the
5 average election, Republicans -- you know, narrowly the
6 Republicans win statewide elections in Ohio.

7 Q. And, in fact, in 2018, Republicans won every -- they won
8 the governor, the attorney general, the auditor, the treasurer
9 and the Secretary of State; correct?

10 A. Yes, I believe that's true.

11 Q. And I think you predicted where I was going, but, I mean,
12 you'd agree with me that Ohio is leaning farther to the right
13 in this decade than in the prior decade; right?

14 A. Yes, I think that's fair to say.

15 Q. Let's talk a little bit more about the efficiency gap. So
16 when was the efficiency gap first proposed as a measure of
17 partisan bias?

18 A. Well, it was proposed by a political scientist named Eric
19 McGhee in a peer-reviewed article in *Legislative Studies*
20 *Quarterly* in 2014.

21 Q. Okay. And then later Eric McGhee co-authored or authored a
22 number of -- or some papers with another person, a law
23 professor named Nicholas Stephanopoulos; right?

24 A. Yes.

25 Q. Okay. And is it fair to say that the efficiency gap was

1 proposed as a measure of partisan bias for the purpose of
2 addressing concerns raised by the U.S. Supreme Court in
3 prior -- in redistricting litigation in the 2000s?

4 JUDGE BLACK: Excuse me.

5 MS. THOMAS-LUNDBORG: Foundation.

6 JUDGE BLACK: There's an objection as to foundation.

7 It's noted.

8 A. Well, I don't -- I wouldn't want to peer inside the minds
9 of the authors. I'm fairly certain that wasn't Eric McGhee's
10 intent when he originally developed it. That may have been --
11 I think that was the thrust of the law review article that he
12 later published with Stephanopoulos, but I don't think that was
13 the original motivation for it. I think it was simply that he
14 thought that the symmetry measure developed by Gary King and
15 co-authors had some theoretical and empirical drawbacks, so he
16 wanted to just develop a better measure of partisan bias.

17 Q. Now, you mentioned a later law review article. Professor,
18 are you referring to the 2015 University of Chicago law review
19 article entitled "Partisan Gerrymandering and the Efficiency
20 Gap" authored by Stephanopoulos and McGhee?

21 A. Yes, I am.

22 Q. Okay. All right. Now, Professor Warshaw, is it fair to
23 say that the efficiency gap was proposed as a measurement of
24 partisan bias across an entire congressional district plan?

25 A. Yes.

1 Q. And would you agree with me, Professor Warshaw, that the
2 efficiency gap analysis you conducted in this case would not be
3 able to tell us if a specific congressional district was drawn
4 with discriminatory partisan intent; correct?

5 A. That's correct. It's focused -- the plan as a whole had a
6 partisan intent.

7 Q. And would you also agree with me that the efficiency gap
8 analysis you conducted in this case would not be able to tell
9 us if the plan exhibited a discriminatory partisan effect on
10 the voters of a specific district?

11 A. I don't know that I thought about it quite like that.
12 My -- the analysis in my report is focused at the statewide
13 level.

14 Q. Okay. Now, for purposes of comparing Ohio's efficiency gap
15 to the efficiency gap of other states, you don't compare Ohio
16 to all other of the 50 states, do you?

17 A. No. As I discuss in the report, I compare it to states
18 with more than six congressional districts.

19 Q. And why did you define the cutoff at states with six
20 districts in this plan?

21 A. Well, I think the exact cutoff is a little bit arbitrary,
22 but tell -- Eric McGhee and then later Stephanopoulos and
23 McGhee discuss in their papers, the efficiency gap -- one of
24 the drawbacks of the efficiency gap is that it can be highly
25 variable in states with a very small number of districts. So

1 to have the most reliable inference as possible of a partisan
2 bias, I simply don't look at small -- states with a small
3 number of congressional districts.

4 Q. Okay. Now, are you familiar with the work of Professor
5 Wendy Tam Cho?

6 A. Broadly speaking, yes.

7 Q. All right. And do you recognize her as a political
8 scientist who has published and taught on redistricting issues?

9 A. Yes.

10 Q. Are you aware that, 2017, Professor Cho published a paper
11 in the *University of Pennsylvania Law Review* at Volume 166,
12 page 18, entitled "Measuring Partisan Fairness: How Well Does
13 the Efficiency Gap Guard Against Sophisticated as Well as
14 Simple-Minded Modes of Partisan Discrimination"?

15 A. I think so. Yeah, I don't have that -- I don't have the
16 exact -- I don't have it clearly in my mind, but I think I've
17 seen it at some point. I know during deposition we discussed a
18 paper by Cho, and I can't remember if that's the one. So it
19 would be helpful, if you have specific questions, to put it in
20 front of me.

21 Q. Sure. Absolutely. We can do that.

22 MR. LEWIS: Why don't we display Intervenors' Exhibit
23 50, and we'll start at the first page.

24 Q. I'm showing you what has been identified as Intervenors'
25 Exhibit 50, Professor Warshaw. I'll represent to you that this

1 was an article published by Professor Cho that we did use in
2 your deposition. Do you recognize this article?

3 A. Yes, it looks familiar now.

4 Q. And I'd like -- and you have reviewed this article, have
5 you not?

6 A. At some point in the past. Again, I can't remember all the
7 details, but I have read it at some point.

8 Q. Sure. I'd like now to turn to --

9 JUDGE BLACK: Excuse a me.

10 MS. THOMAS-LUNDBORG: If counsel has a copy of the
11 article.

12 MR. LEWIS: It's been marked. It's Intervenor's
13 Exhibit 50.

14 A. You're going to show me on the screen anything you want me
15 to comment on?

16 Q. Yes. I don't have very much to comment on the article. It
17 shouldn't -- hopefully we --

18 JUDGE BLACK: Should we pause until they have a copy
19 of it? We're pausing until you have a copy of it. Somebody
20 appears to be frantically searching through a bag.

21 MS. THOMAS-LUNDBORG: Thank you.

22 JUDGE BLACK: You may proceed. The copy's been
23 provided to the plaintiffs' counsel.

24 MS. THOMAS-LUNDBORG: Yes, Your Honor, I have a copy
25 now.

1 JUDGE BLACK: Very well.

2 Q. And, specifically, Professor Warshaw, I'd like to turn
3 to -- we'll put up on the screen for you page 20 of the
4 article, which is the fourth page of the -- law review articles
5 have that pagination issue. There's page 20.

6 And, Professor, on this page of the article she --
7 Professor Cho -- describes what she calls, quote -- and this is
8 the highlighted sentence here at the top -- "a basic and
9 uncontroversial requirement for a partisan fairness measure
10 as," quote, "the ability to produce a value that is comparable
11 across electoral plans."

12 Do you agree with Professor Cho's statement?

13 A. At a broad level, yes.

14 Q. Now, because you, for your efficiency gap analysis, you
15 only consider states with at least six districts in the plan,
16 does that mean that you don't consider any electoral plans with
17 states that have less than six districts?

18 A. Exactly. I don't examine states with six or fewer
19 districts.

20 Q. Okay. Now, Professor Warshaw, in Footnote 10 on the same
21 page of this article, Professor Cho offers the view that,
22 quote, "A general measure of partisan fairness should, however,
23 work for any size delegation."

24 Do you agree with that statement?

25 A. No.

1 Q. So you think -- you think she's wrong?

2 A. I do.

3 Q. Now, at the end of this paragraph on this Footnote 10 --

4 A. I'll give an analogy.

5 Q. Sure.

6 A. So we have lots of metrics, for instance, the DW-Nominate
7 metric that we use for the roll call voting in Congress. If --
8 we used it for -- to measure the ideology of all members of
9 Congress; however, I wouldn't recommend using it if a member of
10 Congress only casts, say, five roll call votes, because the
11 measure would be extremely noisy if you only cast five roll
12 call votes. But that doesn't impugn the overall validity of
13 the measure.

14 So, too, I wouldn't recommend a -- the efficiency gap or
15 indeed most of the other metrics that I use for a plan with
16 only a handful of congressional districts for the simple reason
17 that the metrics would be extremely noisy. But just as that
18 doesn't impugn the validity of Nominate scores, it also, in my
19 view, doesn't impugn the validity of the partisan bias metrics.

20 Q. Now, Professor Cho -- back to my question. Now she's
21 responding in this article to Stephanopoulos and McGhee, who
22 you indicated used eight districts as the cutoff as compared to
23 six; right?

24 A. Well, I used seven as the cutoff.

25 JUDGE BLACK: Excuse me. Excuse me.

1 MS. THOMAS-LUNDBORG: Foundation.

2 JUDGE BLACK: There's an objection as to foundation.

3 A. Well, I used more than six, so seven is my cutoff, and I
4 think the appropriate comparison for them is eight. And
5 there's no strong reason for that. I think that's an arbitrary
6 difference between seven and eight. It wouldn't affect any of
7 my results.

8 Q. So she indicates in her -- she has a count -- she says at
9 the end of this paragraph, quote, "While larger states have
10 more districts, restricting the analysis to states with eight
11 or more Members of Congress removes data from twenty-nine (or
12 58% of) the states."

13 Do you disagree with her calculation that "restricting the
14 analysis to states with eight or more Members of Congress
15 removes data from twenty-nine [of]...the states"?

16 A. Well, you'd have to focus on a particular redistricting
17 period to make that precise. So I don't know what
18 redistricting period this is referring to, but certainly it's
19 approximately right.

20 Q. And do you know, as you sit here today, how many states,
21 for your analysis of the 2012 congressional district plan, you
22 omitted data from due to the fact that the state did not have
23 at least seven congressional districts in its plan?

24 A. I believe 26.

25 Q. 26.

1 A. So, in my view, this isn't -- this is a ripe area for
2 social science research, and I think that going forward
3 researchers will develop better metrics for states with smaller
4 numbers of congressional districts. The fact that our metrics
5 aren't as useful for states with very small number of districts
6 doesn't mean they don't tell us something very useful about the
7 states with more than six districts, which constitute the vast
8 majority of districts in Congress.

9 Q. And, similarly, would you also agree with me that the
10 efficiency gap becomes less reliable in cases where you have
11 this -- an extreme result, for example, I think you mentioned
12 Massachusetts as an example where one party wins all the seats
13 but has less than a hundred percent of the vote.

14 A. No, I don't agree with that.

15 I think it's important to be clear. The efficiency gap is
16 not a metric of proportionality. So it's not asserting that
17 there needs to be a one-to-one relationship between votes and
18 seats.

19 Q. Now, do you recall -- do you recall when we took your
20 deposition on November 30, 2018?

21 A. Yes.

22 Q. Okay. And a court reporter was present; correct?

23 A. Yes.

24 Q. The court reporter -- and you were sworn to tell the truth
25 just as you are today?

1 A. Yes.

2 Q. All right. Do you recall me asking you the question if
3 there are any factors that make the efficiency gap less
4 reliable in certain instances?

5 A. No, not specifically. But I'm sure you did. I trust the
6 transcript.

7 Q. Okay. Well, let's pull the transcript up.

8 If we can go to page 60.

9 Okay. And specifically I'm looking -- we're going to --

10 And on page 60 at line 16 I asked: Are there any factors
11 that make the efficiency gap less reliable in certain
12 instances?

13 Do you see that?

14 A. I did. This isn't the question you just asked me, though.

15 Q. Okay.

16 A. So in Massachusetts, Democrats don't, in fact, win more
17 than 75 percent of the vote; they win more than 75 percent of
18 the seats.

19 Q. I see. Okay.

20 A. So if they had won more than 75 percent of the vote, which
21 has happened, at most, a handful of times in U.S. history, then
22 it is true that the efficiency gap can yield weird answers.
23 But, again, I think in the real world that we live in, that's
24 not a case that happens very often, if ever.

25 Q. Okay. Well, thank you for clearing that up. I appreciate

1 it. All right.

2 I'd like to turn to your report on the efficiency gap. So
3 that's going to be PX 571, and specifically Figure 6 on page
4 22. All right.

5 Now, this is your -- this is your scatter plot of
6 efficiency gaps from 1972 through 2016 for the country as a
7 whole; correct?

8 A. That's correct. Again, focusing on states with more than
9 six seats.

10 Q. Got it.

11 A. So seven or more.

12 Q. Seven or more, okay. And in 2012, just to make sure we
13 have the numbers -- I think you report the numbers on page 23
14 of your report, if you need to look at that. But you identify
15 the efficiency gap as approximately negative 22 in 2012; right?

16 A. Yes.

17 Q. And in 2014, however, that number drops to negative nine
18 percent; correct?

19 A. Yes.

20 Q. Okay. And in 2016 it drops a little bit more; right?

21 A. Yeah, just a teeny bit to negative 8.7 percent, I believe.

22 Q. Okay. Now, you've asserted in your report that 75 percent
23 of the efficiency gaps nationwide from 2000 -- or excuse me --
24 from 1972 to 2016 lie between negative ten and positive ten
25 percent; is that correct?

1 A. Yes.

2 Q. So would you agree that even compared to historical norms,
3 an efficiency gap that's within that plus or minus ten percent
4 range is not extreme?

5 A. I think if we were to look -- if the only data we had in
6 front of us was 2014 or '16 efficiency gaps, then I wouldn't
7 say those were historical outliers.

8 Q. And specifically to my question, would you also agree that
9 that -- an efficiency gap of within that plus or minus ten
10 percent range would not be extreme?

11 A. I don't know that I've thought about it in quite that way,
12 but I think we -- I think we wouldn't have enough information
13 on its own to conclude that a plan was an historical outlier if
14 the only data we had in front of was an efficiency gap that lay
15 between negative ten percent and ten percent.

16 Q. And you'd agree with me that your analysis does not provide
17 a specific value of the efficiency gap beyond which you would
18 conclude that a plan was a gerrymander; correct?

19 A. No. As I think I tried to state clearly in both my earlier
20 testimony, as well as in my report, that my view is that we
21 should look holistically at all of the metrics that we have in
22 front of us, as well as at the entirety of the districting --
23 of the elections in the redistricting cycle.

24 Q. Now, you say you need to look at the elections for the
25 entirety of the redistricting cycle. Does that mean you would

1 need to look at, for example, to judge the 2012 plan, that
2 you'd need to see every election conducted through the life of
3 that plan?

4 A. No. I simply mean that we shouldn't put on blinders to
5 data we have in front us. That if we're conducting the
6 analysis today, then we should look at the last four elections.
7 If you were conducting the analysis in the fall of 2013, then
8 you would only have the 2012 election.

9 And so I think if all we had was the 2012 election, and you
10 looked across all of the metrics that we had and concluded that
11 across all of the metrics this looked like an historical
12 outlier, and that could be -- that could be strong enough
13 evidence to judge a plan as partisan gerrymander.

14 Q. Even though two years later the value of the efficiency gap
15 would be cut by more than half?

16 A. Well, this is why I think it's really important to look
17 holistically at all the metrics, because when you look at not
18 just the efficiency gap but at the four other metrics that I
19 show, none of the rest of those metrics show a drop as large
20 the efficiency gap. And, indeed, all of those metrics are
21 quite stable between 2012 and '16. The efficiency gap drops
22 for the mechanical reason that the Republican vote share
23 increased a little bit while, of course, the seat share was
24 designed that it couldn't change.

25 Q. Now, you say that the seat shared was designed so that it

1 couldn't change. Did you study the process by which the
2 General Assembly drew the plan in 2011?

3 A. No. I'm -- I apologize. I used inartful language. What I
4 meant was that the way that the plan is constructed is that the
5 Democratic voters were packed into four districts. So there's
6 really no increase in vote share by Republicans that would
7 enable them to win those four districts, and it would take a
8 huge change in voter preferences to win those four districts.
9 So as the Republican vote share increased a little bit, their
10 seat share really can't change, really can't increase, so the
11 efficiency gap becomes a little bit less pro Republican as a
12 result.

13 Q. Would you agree with me that you don't have a specific
14 value of the efficiency gap where a plan would be considered an
15 historical outlier; is that correct?

16 A. No, there's no single valuing that I looked to. You know,
17 again, I think I would want to look holistically across the
18 metrics. And I think the kind of values that I look to, I
19 don't have a bright line in my head, but if it's, you know,
20 more extreme than, say, 80 percent in the previous plans and
21 more pro Republican than 90 percent, looking at an average
22 across the different metrics, then that wouldn't be
23 dispositive, but it would be indicative of a gerrymander.

24 Q. So a plan that would be -- that would come up to 79 percent
25 as opposed to 80 percent, the 79 percent is not an outlier of

1 the 80 percent; is that your understanding?

2 A. No. Again, that's why I think it's important to be clear
3 that I think a bright line, you know, isn't very useful. I
4 think all we can say is that as the percentile increases, it's
5 more and more indicative of gerrymander. And, no, there's no
6 particular bright line number that I think we should think of
7 as being dispositive.

8 Q. So if you looked at all five of your metrics combined,
9 would you be able to draw a bright line?

10 A. No. Again, I think I would look to the average of all of
11 those metrics and say, you know -- or, on average, do they all
12 suggest that this is an historically extreme level of partisan
13 bias in the direction of the party that conducted the
14 redistricting, and that would be indicative of a gerrymander.
15 But there's no bright line, I think, that, you know, would
16 definitely be a gerrymander above some level and definitely
17 wouldn't be below that.

18 Q. And you're making that determination by judging a specific
19 plan under study compared to an historical average of all plans
20 with at least seven states in the -- or seven districts in the
21 plan since nineteen sev-- over the period of 1972 to 2016;
22 correct?

23 A. That's exactly right.

24 Q. Okay.

25 JUDGE BLACK: Would this be a reasonable time to

1 pause?

2 MR. LEWIS: Oh, I'm sorry, Your Honor, of course.

3 JUDGE BLACK: No. Do you have more?

4 MR. LEWIS: I do, but I am actually at a break point
5 in my outline.

6 JUDGE BLACK: Very well.

7 We're going to break for our mid-morning break. We will
8 break until five minutes of 11:00.

9 During the period of the break, Professor, please do not
10 discuss your testimony with anyone. Understood?

11 THE WITNESS: Yes, Your Honor.

12 JUDGE BLACK: Very well. We're in recess till that
13 time.

14 COURTROOM DEPUTY: All rise. This court is in recess
15 until 10:55.

16 (Witness temporarily excused.)

17 (Recess taken: 10:33 AM - 10:54 AM.)

18 JUDGE BLACK: Please be seated. Thank you.

19 The witness can re-take the stand.

20 The witness remains under oath, and he understands.
21 Correct, sir?

22 THE WITNESS: Yes, Your Honor.

23 (Christopher Warshaw resumes the witness stand.)

24 JUDGE WATSON: Mr. Lewis, could I intervene just very
25 quickly. Professor Warshaw, I think I know what "noisy" means,

1 but would you clarify it for the record, how you were using it.

2 THE WITNESS: Sure. I think, Your Honor, all of these
3 metrics that I'm using are proxies for this underlying concept
4 of partisan advantage or bias-in-districting process, and
5 there's no one perfect proxy for this underlying theoretical
6 concept we're trying to get at. So all of these have some
7 measurement error in their characterization of that underlying
8 concept, and that's why it's useful to look to multiple metrics
9 because all of them are measured with some error.

10 JUDGE WATSON: Right. Thank you.

11 JUDGE BLACK: I won't charge that minute to you. Go
12 ahead.

13 MR. LEWIS: Thank you, Your Honor.

14 BY MR. LEWIS:

15 Q. Now, Professor Warshaw, in a perfect world you would prefer
16 that a plan's efficiency gap be zero; right?

17 A. I don't know that I have personal preferences on it, but a
18 zero efficiency gap would indicate there's no partisan bias for
19 either party.

20 Q. Okay. Would you agree with me, though, that, other than
21 partisan gerrymandering, that other factors could cause a plan
22 to have an efficiency gap in favor of one party or another?

23 A. Yes.

24 Q. Okay. And in your report you cite -- well, let's put it
25 up. If we go to the report at page 16, Footnote 19.

1 So if we could look at -- zoom in on that Footnote 19 in
2 your report.

3 Professor Warshaw, you talk here about, and I'll quote you,
4 "Partisan advantage in the districting process can differ
5 across states for reasons unrelated to the drawing of district
6 lines, such as variation in how different demographic groups
7 are distributed across geographic space."

8 What do you mean by that, Professor Warshaw?

9 A. Well, if voters from one party, as sometimes happens for
10 Democrats, are extremely concentrated in small geographic
11 areas, that can lead to a, you know, small disadvantages in the
12 vote-seat relationship, and that's what the Chen and Rodden
13 2013 article is about that I cite here.

14 And that's perhaps why in their remedial maps for Ohio, as
15 we discussed earlier, that there's still a little bit of
16 lingering pro-Republican bias that could be due to the
17 underlying geography, and that's what I was trying to get at in
18 this footnote.

19 Q. So it's your understanding as a political scientist that --
20 I think you mentioned the Democratic voters can cluster in
21 urban areas; is that correct?

22 A. Yes.

23 Q. Now, if Democrats were able to attract a different
24 coalition of voters, say, for example, they were able to get
25 more suburban voters into their coalition, would that affect

1 the efficiency gap?

2 A. It could, although that's exactly what we saw in 2018,
3 where Democrats did attract suburban voters into their
4 coalition. And, in general, the partisan bias metrics for Ohio
5 stayed almost exactly the same as they'd been in previous
6 elections, which, again, further suggests to me that the
7 geographic factors are not the primary underlying cause in
8 Ohio.

9 Q. But, in general, if you have a party's voters concentrated
10 in a limited geographic space, is it your view that that would
11 be -- is it fair to say, I should say, that that would be an
12 inefficient, you know, geographic distribution of voters in a
13 single-member district system?

14 A. Yes.

15 Q. Okay. And in your Footnote 19 you go on to say, and I'll
16 quote you, that "It can also be affected by the intentional
17 drawing of district lines to accomplish goals other than
18 maximizing partisan seat share, such as ensuring the
19 representation of racial minorities."

20 Do you see that?

21 A. Yes.

22 Q. And how can partisan advantage -- and I assume that the
23 word "It" that begins the sentence refers back to "Partisan
24 advantage in the districting process," the prior sentence?

25 A. Yes.

1 Q. Okay. I've done that many times in my own writing.

2 So how might ensuring the representation of racial
3 minorities affect partisan advantage in the districting
4 process?

5 A. Well, you can imagine in some cases in order to accomplish
6 Voting Rights Act goals you have to put, you know, 45 or 50
7 percent -- you create a district that is composed of 45 or 50
8 percent minority voters, typically. And since most African-
9 Americans vote for Democrats, that could also lead to a
10 district that is -- that Democrats are likely to win.

11 Q. And besides ensuring the representation of racial
12 minorities, are there other goals that a redistricting
13 authority might pursue that could have a -- that could affect
14 partisan advantage in the districting process?

15 A. Yes.

16 Q. Can you give some examples?

17 A. It's not something I've thought about, so I actually can't
18 give examples. But I'm willing to concede the point. There
19 probably are.

20 Q. Okay. So, for example, let me just offer one and get your
21 reaction. If, for example, the redistricting authority was
22 attempting to preserve communities of interest, might that be a
23 factor that could lead to a partisan advantage in the
24 districting process?

25 A. I don't know. I have never looked at that, nor has any

1 political scientist that I know of.

2 Q. Okay. How about incumbency protection?

3 A. On average, I don't think incumbency protection should
4 affect the partisan bias, but it could lock in partisan bias
5 that just happened to have occurred right before the
6 redistricting, which is possible. It's part of what happened,
7 I think, in the 2011 redistricting plans. And that's why, in
8 my view as a scholar of representation, incumbency protection
9 is not a normative goal that we should aspire to, since I
10 think, in general, a plan that seeks to protect incumbents may
11 have pernicious consequences for representation.

12 Q. But I believe you've also testified earlier this morning
13 that incumbency can offer states an advantage in Congress if
14 they have more senior members of Congress; correct?

15 A. It can, but I think if it locks in a partisan bias that was
16 accidental or occurred -- you know, 2010 was an historic wave
17 election for Republicans. So I think a redistricting plan that
18 locks in that partisan advantage for Republicans and seeks to
19 make it durable over many future elections, I think that the
20 representational harms from that outweigh any advantages from
21 having more senior incumbents in Congress.

22 Q. Would you agree with me, though, that others could disagree
23 with that view in good faith?

24 A. It's possible, but I don't -- I think that what I just
25 stated would be a consensus view in political science --

1 Q. Okay.

2 A. -- particularly since, as I talked about earlier, I think
3 the value of having a long-serving incumbent, while real, is
4 relatively small, and I think is actually a source of debate in
5 the literature. So I don't think it's -- I don't think it's a
6 very large advantage.

7 Q. Okay. Professor Warshaw, in your analysis in this case did
8 you calculate what percentage of the Ohio efficiency gap is
9 attributable to factors other than what you believe is
10 intentional partisan gerrymandering?

11 A. No. But if you look at the very next page of my report, on
12 page 18 --

13 Well, it's on page 17 in Figure 3 which we talked about --
14 or I talked about earlier in my direct testimony.

15 -- we can see that partisan control through districting
16 process accounts for a large -- the bulk of the variation in
17 changes in -- in the efficiency gap and other metrics between
18 2010 and '12. And Ohio itself shifted 12 points in a
19 pro-Republican direction right when the new map kicked in, and
20 that was true across the different metrics. So from that I
21 conclude that, certainly in Ohio, partisan control of the
22 redistricting process had quite a large effect on all the
23 metrics that I look at.

24 Q. But you can't -- but in your report you do not offer a
25 specific value of the efficiency gap in Ohio that is

1 attributable to any particular non-gerrymandering related cause
2 of a -- of the efficiency gap in Ohio; right?

3 A. That's right. That's exactly why I think -- we shouldn't
4 have a bright line, but instead look to historical outliers,
5 because I think to believe that these factors were the primary
6 driver for the partisan bias in Ohio, you would have to think
7 that the degree of urban concentration of Democrats was unlike
8 any other state in history, and also the kind of VRA objectives
9 that they faced in Ohio was unlike any other state in history,
10 which strikes me as a social scientist as unlikely.

11 The far more likely hypothesis based on the data that I
12 present in Figure 3 and then on the next page in Table 5 is
13 that, in fact, partisan control of the redistricting process is
14 exactly what drives the bulk of the partisan bias in these
15 plans that I'm finding.

16 Q. Now, Professor Warshaw, I'll probably -- we'll probably
17 come back to Figure 3 on page 17, but since you brought it
18 up --

19 MR. LEWIS: If we could pull up Figure 3 on page 17,
20 please.

21 MR. WILLIAMSON: Yes.

22 Q. Okay. When you plot this change -- well, first, for this
23 calculation does your analysis look at --

24 You know, you show Republicans controlled the redistricting
25 process in this topic. On the left-hand side you say control

1 of redistricting process in favor of Republicans; right? What
2 does that mean if Republicans are in control of the
3 redistricting process for purposes of this figure?

4 A. That they have unified control of government or they
5 control both legislative chambers and the governorship. And
6 the legislature actually does control redistricting. It's not
7 a state where a commission decides redistricting.

8 Q. Does this analysis look at who controlled the redistricting
9 process in the prior dissenting redistricting process?

10 A. No. So I think that if we did, that would help magnify my
11 findings and it would suggest I believe that Republicans also
12 controlled the redistricting process in Ohio in the previous
13 cycle. So what it might show is that the effects of
14 gerrymandering compound on each other.

15 Q. And does this -- and this particular chart only shows the
16 difference in the efficiency gap between 2010 and 2012;
17 correct?

18 A. Yes. Because I think that difference is most indicative of
19 the immediate impact of the redistricting plan.

20 Q. Okay. So if there was any variation in a given state or in
21 the country as a whole in 2010 compared to 2012, wouldn't that
22 affect -- if 2010 was unlike the average efficiency gap over
23 the course of the prior decade, wouldn't that potentially
24 affect this result?

25 A. It certainly could. I mean, none of these metrics are

1 perfect. But primarily that would be a shock that would affect
2 the country as a whole. So to the extent there's an intercept
3 shift, it would affect all states equally rather than just
4 states that Republicans or Democrats controlled, which is what
5 this chart is splitting out.

6 Q. You didn't study the politics of Ohio in particular in 2010
7 for this analysis, did you?

8 A. No. I'm familiar with my academic work, as we talked about
9 in deposition, with the politics of Ohio at a general level,
10 but for purposes of this report, I didn't conduct any
11 specialized analysis of Ohio voting patterns in 2010 beyond
12 what I show in the report.

13 Q. So just by looking at this figure, we couldn't tell if
14 there was any idiosyncratic effect in Ohio that may influence
15 where on that -- you know, the change in the efficiency gap
16 that you measure between 2010 and 2012; right?

17 A. No. Looking at Ohio in isolation we couldn't. But that's
18 why I conduct the analysis at a nationwide level, to show that
19 in the table on the following page that the effect of partisan
20 control of redistricting is a large and statistically
21 significant effect looking across all the states in the
22 country, and in that case we can rule out idiosyncratic effects
23 looking at the nation as a whole.

24 Q. Okay. Now, returning to my prior line of questioning, can
25 you give me a value of the -- or the percentage of Ohio's

1 efficiency gap in 2012 that is attributable to VRA-related
2 issues?

3 A. I cannot.

4 Q. Can you given me a percentage of Ohio's 2012's efficiency
5 gap that's attributable to any other idiosyncratic factors in
6 the state, for example, the communities of interest and similar
7 considerations?

8 A. No. I think for purposes of comparing the Ohio plan
9 specifically to these other base lines of a -- what is, quote,
10 "neutral and non-partisan redistricting process," I think for
11 the purposes of that, Professor Chen's testimony later this
12 week will be most useful.

13 I'm sorry. Professor Cho. I'm sorry.

14 Q. Now, more broadly in your report you offer the opinion that
15 you believe, depending on what year, that partisan bias has
16 resulted in Republicans winning between one and four more seats
17 in Congress from Ohio. Is that fair?

18 A. Yes.

19 Q. Okay. But you can't tell us an exact number; right?

20 A. No.

21 Q. And you can't tell us what number of seats, if any, you
22 believe Republicans gain due to the effect of intentional
23 partisan gerrymandering versus any of the other factors we
24 talked about like geography or VRA goals; correct?

25 A. No.

1 Q. Now, Professor Warshaw, you'd agree with me that the
2 efficiency gap can be volatile throughout the life of a
3 congressional plan; right?

4 A. Yes, I think I tried to be transparent about that in my
5 report, particularly for states with a small number of
6 districts, but even for larger districts it can be -- numbers
7 of districts, it can be somewhat volatile.

8 Q. Sure. And let's pull up your supplemental report PX 476,
9 page six and Figure 3.

10 A. I'm sorry. Where are you?

11 Q. We're going to be -- we'll get it up on the screen here,
12 but we're at page six, Figure 3.

13 A. Of --

14 Q. The supplemental report.

15 A. The 2018 report.

16 Q. Yes. The supplemental report, tab 3 in your binder.

17 A. Terrific.

18 Q. Now, this is your scatter plot of the efficiency gap in
19 Ohio from two thousand -- or, excuse me, from 1972 to 2018 for
20 all states with at least seven districts; right?

21 A. Yes.

22 Q. Okay. The efficiency gap in Ohio jumps around quite a bit
23 from 2012 to 2018; does it not?

24 A. I think it jumps around a fair bit. All of the values
25 display a pro-Republican map, but the level of extremity jumps

1 around.

2 Q. So if a court is going to consider striking down a
3 districting plan as an impermissible partisan gerrymander,
4 doesn't it really matter what years the Court looks at in its
5 analysis?

6 A. Well, yes, if you were only looking at the efficiency gap.
7 But, first of all, I'd say a court -- most indicative of the
8 gerrymander is going to the first plan after -- the first
9 election after the plan goes into place, which is why I focus
10 on that in the bulk of my report.

11 And second, given the availability of multiple metrics, I
12 would recommend that a court use the available metrics that we
13 have.

14 So in this case I calculate five different metrics. And
15 the other four -- all four of the other metrics are
16 substantially less volatile than the efficiency gap. So
17 looking across the metrics, it's very clear that the Ohio plan
18 has an historical anomalous level of partisan extremity.

19 MS. THOMAS-LUNDBORG: Your Honors?

20 JUDGE BLACK: Yes.

21 MS. THOMAS-LUNDBORG: I just wanted to register an
22 objection to the last question as asking the witness to render
23 a legal opinion.

24 JUDGE BLACK: Very well. None of the witness' answers
25 are to be deemed legal conclusions.

1 MR. LEWIS: Yes. Thank you, Your Honor. It was not
2 the intent of the question.

3 JUDGE BLACK: Understood.

4 Q. So if we turn to this -- if we go back to this efficiency
5 gap, and I -- if we look at -- if I understand correctly, your
6 assessment of Ohio's efficiency gap, it is based on the fact
7 that it's an outlier, historically speaking; right?

8 A. That's correct.

9 Q. Okay. And if that's the standard that we use to judge a
10 gerrymander, an outlier statistic -- why don't you define for
11 the Court what an outlier means, statistically?

12 A. A value of a distribution that's more extreme than the
13 majority -- than a large majority of the values of that
14 distribution.

15 Q. And so if we imagine the bell curve where you're talking
16 about an outlier, you're in that little tail at the end, one
17 end or the other of the bell curve; right?

18 A. Exactly. That's what I show on Figure 1, two pages earlier
19 than this.

20 Q. Sure. So if we take the view that an efficiency gap score,
21 Ohio's efficiency gap score in 2012 is beyond the pale and we
22 draw the line and we say at that level it's an impermissible
23 gerrymander, we draw the line -- and we'll just draw a line
24 there. That works. Okay.

25 Then in future years isn't it a huge risk that a plan

1 that -- for example, it looks like we -- and I realize this is
2 not an exact science, but if we look at some of those other
3 values for the efficiency gap in states in, for example 2012 or
4 2014, in future years, wouldn't those plans become the outlier?

5 A. Well, I think that our evaluation of outliers, it's
6 possible, could evolve, but I think that the -- it's not
7 something I've thought about in any detail. I think that, for
8 now, what we can say is that the current Ohio plans are an
9 outlier, you know, really no matter what your definition is,
10 your precise definition is. So I don't think that we need to
11 figure out how this -- how we might use a standard in ten years
12 or 20 years that --

13 Q. Yeah. Okay. So if the -- if the analysis of these plans
14 is an outlier depends on where a plan falls in historical
15 average, if you're a redistricting authority in, say, 2021
16 trying to draw your plans, how would you know if an efficiency
17 gap score or potential score for a plan would be an outlier at
18 the time you're drawing the plan?

19 A. Well, I think that if you didn't use partisan intent in
20 drawing the map, it wouldn't be something you'd have to worry
21 about because it wouldn't be anywhere close to being an
22 outlier.

23 Q. But if -- is that a normative judgment of yours that
24 redistricting authorities should not consider partisanship in
25 connection with drawing districts?

1 A. It's not something I've thought -- I don't have an opinion
2 about that.

3 Q. Well, regardless of whether they consider intent or not, if
4 redistricting authority is trying to decide, Am I going to
5 adopt this plan or not? Is my plan going to get struck down as
6 a gerrymander under the Warshaw test?, how do they determine if
7 they're an outlier or not?

8 A. Well, I think if you evaluate a plan based on the various
9 metrics that I have proposed and based on those metrics as we
10 talked about earlier, if it's an outlier on looking across
11 those metrics on all or most of those metrics, then that would
12 be indicative that it's a gerrymander. And I can't speak to
13 the legal standard of when courts should strike it down, but --

14 Q. And then for each successive year in a plan, the line for a
15 statistical outlier, depending on where you set it, could
16 change from year to year; correct?

17 A. Well, I think that, again, I would focus most of all on the
18 first year of a plan, and then I would look to the average of
19 all of the results of the remainder of the plan. And if we do
20 that in the case of Ohio, if we look at the results across the
21 average -- the average results across all the plan, on all --
22 on most or all of the metrics, it's still more extreme than 95
23 or 96 percent or more pro Republican, I should say, than at
24 least 95 percent of previous plans. And I think any
25 statistician or political scientist would agree that that's an

1 outlier.

2 Q. But those values -- if you're looking at an average, with
3 each succeeding year you're adding additional data to the data
4 set; right? I mean, every year you're getting however many
5 more elections or however many more dots are getting added to
6 the average; right?

7 A. Yes.

8 Q. Okay. So each year that calculation of what is or is not
9 an outlier changes; doesn't it?

10 A. It will change a little bit, but that's true of any
11 statistical distribution: that you're adding data to it. I
12 mean, I think the lesson of the last 40 years is you can look
13 at the graph and it hasn't changed dramatically. I mean, in
14 the 1970s we had plans that displayed partisan bias just like
15 we do today.

16 Q. Okay. Professor Warshaw, you indicated in your report that
17 you believe that an efficiency gap could be somewhat sensitive
18 to the outcome of a handful of close elections. Do you recall
19 that?

20 A. Yes.

21 Q. Okay. And, specifically, let's pull up your rebuttal
22 report. P572. And specifically I'd like to direct you to page
23 three. That's tab 2 for those following in paper.

24 Now here, Professor Warshaw, I believe that you're
25 responding -- and I'm under section 3.2, that first paragraph.

1 And here you're responding to a criticism, by Professor Tom
2 Brunell, of your efficiency gap analysis; correct?

3 A. Yes, that's correct.

4 Q. Okay. And I believe you're responding to a criticism that
5 he raises around the volatility of the efficiency gap; correct?

6 A. Yes.

7 Q. Okay. And one comment that you made, about six lines down,
8 you have a sentence, and it reads, "No state with more than 6
9 seats went from an Efficiency Gap that dramatically favored one
10 party (as does Ohio's) to one that favored the other party."

11 Do you see that sentence?

12 A. I do.

13 Q. And why is that representation you've made in that
14 sentence, why is that important to understanding your point in
15 response to Professor Brunell's criticism of volatility?

16 A. Well, I think the most important part of my responses are
17 the quantitative responses later. I mean, this was merely
18 illustrative --

19 Q. Sure.

20 A. -- to sort of qualitatively describe the durability. But
21 if you had a number of states that went -- like if you imagine
22 the efficiency gap in Ohio went from negative .2 for favoring
23 Republicans to .2 favoring Democrats and it bounced back and
24 forth and there were a large number of states where that was
25 true, you know, then it could be concerning about what this was

1 capturing. In fact, we don't observe that in the real data.

2 Q. Okay. Now I'm just returning briefly to the point about,
3 you know, the results being impacted by a couple of close
4 elections. Ohio had a few pretty close congressional elections
5 in 2018; did it not?

6 A. Yes. We talked about earlier there were, I think, two
7 maybe competitive elections where the Republican won with 51
8 and a half percent or so of the vote.

9 MR. LEWIS: Okay. And why don't we pull up
10 Plaintiffs' Demonstrative 72.

11 Q. And, Professor Warshaw, is it fair to say that there were
12 two congressional elections in Ohio that the Republican won
13 with less than 52 percent of the vote?

14 A. Yes.

15 Q. Okay. So wouldn't you agree with me that the efficiency
16 gap in Ohio in 2018 could have been impacted by those two very
17 close races?

18 A. Yes. But I think those -- while those were competitive
19 races, the result wasn't -- it wasn't so close that I would say
20 the result was random. I mean, the Republican won those races
21 by three points, so most -- if you were to rerun this --
22 imagine this as sort of a simulation. If you were to rerun
23 this simulation a hundred times of this race, the Republican
24 would have won that race the large majority of those times.
25 This isn't a case where it, like, you know, randomly could have

1 tipped back and forth between Democrats and Republicans.

2 So I think what we'd be most concerned about is a race
3 where, you know, one party won with like 50.1 percent of the
4 vote, because that truly could have been -- you know, anything
5 could have determined that close of an election, but I wouldn't
6 put these in that category.

7 Q. So you don't believe that any candidate -- for example, you
8 don't believe that any candidate-specific factors could have
9 influenced the election outcomes in the 1st or 12th
10 Congressional Districts?

11 A. No, that's certainly not what I'm saying. I mean, I think
12 that certainly candidate-specific factors affect any election.
13 But I think here we look at the broad patterns across
14 districts, and that reflects the Republican advantage in this
15 map.

16 Q. But if, for example, those two results were flipped or even
17 one -- let's say, for example, if District 1 had flipped and
18 instead the Democrat had prevailed at 51 percent, would that
19 have affected the efficiency gap in Ohio?

20 A. Absolutely. But I think the thing to keep in mind is it
21 also would have increased the Democrats' vote share. So it
22 wouldn't -- it's not like you would have -- you would hold the
23 vote share constant and assume a seat flip.

24 Like if you increase the Democrats' vote share in this
25 district, that would increase their statewide vote share. And,

1 indeed, most commonly the thing that would increase their vote
2 share in this district would actually be a uniform shift in the
3 Democrats' seat vote share in all districts. So that would
4 imply that with a higher vote share, Democrats should get a
5 higher seat share. So the effect on the efficiency gap is
6 actually somewhat ambiguous, probably would lead to a slightly
7 less pro-Republican efficiency gap, but probably not by as much
8 as just shifting the seats would imply.

9 Q. So, Professor Warshaw, I'd like to turn to, very briefly,
10 your efficiency gap analysis of Mr. Cooper's proposed remedial
11 plan. And, specifically, let's turn to page 15, Table 3 of
12 your supplemental report, which is P476 or tab 3 in the binder.

13 A. Yes. I believe I'm there now.

14 Q. Okay. So this provides your analysis, this Table 3 on page
15 15 of the supplemental report, this provides your calculation
16 of the efficiency gap of Mr. Cooper's proposed remedial plan
17 from 2012 to 2018; correct?

18 A. Yes.

19 Q. Okay. And you calculate the efficiency gap of his proposed
20 plan as a negative .11 in 2012; right?

21 A. Yes.

22 Q. And so in your view would that be a fairly strongly
23 pro-Republican efficiency gap?

24 A. Yes. If you're looking at that in isolation, I wouldn't
25 say it's a large anomaly, but that's a pro-Republican --

1 certainly a pro-Republican efficiency gap.

2 Q. Okay. What's the plan's efficiency gap in 2018?

3 A. .05.

4 Q. So that's an efficiency gap of five percentage points in
5 favor of the Democrats; correct?

6 A. Yes.

7 Q. All right. So when you earlier responded to Professor
8 Brunell's criticism by indicating that no state with more than
9 six seats went from an efficiency gap that dramatically favored
10 one party to one that favored the other party, isn't that
11 exactly what the efficiency gap does with Mr. Cooper's remedial
12 plan?

13 A. No, I think I intentionally used the language
14 "dramatically." And the example I provided was a state like
15 Ohio that had a negative 20 percent efficiency gap flipping to
16 being positive. I mean, I think that as -- as I responded to
17 the question from the Judge earlier, there's measurement error
18 on any of these metrics, and the closer they get to zero. The
19 less surprising it is that -- they're going to bounce around a
20 little bit over time, which we've talked about at length now.
21 So it's less surprising that, occasionally, one would flip over
22 the zero line.

23 But if you look, on average, across these metrics, you
24 know, as we talked about, all of them display a little bit of
25 pro-Republican advantage, which may reflect geography or other

1 factors, but on average, they reflect relatively little
2 partisan advantage. So I'd say, on average, this is a
3 relatively neutral map.

4 Q. Right. So a 16-point shift in the efficiency gap to you is
5 not particularly significant; is that correct?

6 A. Well, as we talked about, I think the efficiency gap can be
7 volatile election to election, and that's why it's important to
8 look at the average across multiple metrics and, if they're
9 available, multiple elections.

10 Q. At the very end of this -- the farthest right column, you
11 calculate averages. Does that average also include the 2014
12 House elections?

13 A. To be honest, I'm not sure.

14 Q. Okay. 2014 was a good year for Republicans, right, in
15 Ohio?

16 A. Yes.

17 Q. Okay.

18 A. Though it's important -- I mean, to the extent it affected
19 the metrics, we talked about earlier in general they had a
20 little bit less pro-Republican bias that year. So I think if I
21 had included it, if anything, it would make these maps look
22 probably more neutral than they do here.

23 Q. But you didn't perform or report that calculation here, did
24 you?

25 A. I don't think so, but I'm not a hundred percent sure, to be

1 honest. I would have to go back to my code to check for sure.
2 I don't show it in the table, which suggests I probably didn't
3 include it in the average, but I'm not a hundred percent sure.

4 Q. Okay. Now, earlier you testified about using a model to
5 impute results in un-- to uncontested congressional races;
6 right?

7 A. Yes.

8 Q. Okay. Now, from your Table 3, where you report that
9 efficiency gap of negative .11 in Mr. Cooper's remedial plan,
10 that wasn't your original calculation of the efficiency gap for
11 2012, was it?

12 A. To be honest, I don't know.

13 Q. You don't know, okay.

14 A. I'm happy to look at a page if you want to point me
15 somewhere.

16 Q. Happy to do it. So let's go back to your initial report,
17 PX 571. And I believe where we want to be is page 33 in Table
18 8. Maybe we can keep the -- let's keep Table 3 up on the
19 screen, and maybe if everyone's got their books, we can just
20 refer back. It might be the easiest way to do this.

21 A. Great.

22 Q. All right. So page 33 and Table 8. And here you calculate
23 the efficiency gap for 2012 as a negative .08; correct?

24 A. That's correct. I think here, as you are implying, I
25 didn't impute the uncontested districts in my initial report

1 maybe.

2 Q. Okay.

3 A. But I think I did in the later reports.

4 Q. And so the effect of -- and I think you answered my
5 question.

6 So the decision to impute results to those uncontested
7 elections can affect the efficiency gap; right?

8 A. Yes. And I think it's certainly the best methodological
9 practice to impute the uncontested races, particularly when
10 you're looking at observational results. I think when you're
11 looking at simulations, it's a little bit less clear. I still
12 think it's probably best practice to impute them, but still I
13 think the best practice is a little bit more in flux. But in
14 my view, what I would recommend someone do is impute them,
15 which is what I did in my later reports when we realized I
16 hadn't done that in the main report.

17 Q. Okay. And the method that you used to impute those results
18 you mentioned was a -- how do you impute results?

19 A. So I used the results in contested elections, in past and
20 future elections, as well as results-available data from other
21 elections. So in this case I used precinct-level results.

22 So the imputation model here focused just in Ohio, and it
23 was -- I imputed precinct-level congressional results based on
24 past and future congressional results in that precinct as well
25 as presidential voting patterns in that precinct.

1 Q. And how did you determine what past and future election
2 results to use to calculate to impute a value in 2012 for those
3 uncontested races?

4 A. So in the case of 2012, I would have just used future
5 results. There is no past results that we can use for this
6 map.

7 Q. Sure. And how did you decide which races to include in
8 that -- in your calculation of the imputed result?

9 A. Well, methodologically I used the same approach that I used
10 for the observational -- for the uncontested congressional
11 races in my main report, which was to simply use the
12 congressional results and the presidential results. So that
13 you could -- you could think of this model as really being
14 identical to what I describe in my appendix to my main report,
15 except being at the precinct level rather than at the
16 congressional district level.

17 Q. And is there any disagreement in the literature about how
18 to construct that imputation model?

19 A. Not really. Not at a theoretical level. People use
20 different statistical models. So I used an open-source
21 statistical model that I helped develop. But, you know, there
22 was no disagreement in theory about whether you should use
23 available statewide elections as well as past and future
24 results at the congressional district level.

25 And, for instance, that's what Eric McGhee has done in his

1 various papers, Gary King does and Andrew Gelman in their
2 seminal papers. Simon Jackman has used that approach in his
3 expert reports for cases like this one. So I don't think
4 there's any disagreement about the basic approach.

5 Q. All right. And specifically as applies to Mr. Cooper's
6 proposed remedial plan, is it fair to say that your -- the
7 imputation of results to the uncontested races in 2012, in
8 fact, moves the efficiency gap for 2012 in the remedial plan
9 outside that plus or minus ten percent efficiency gap guideline
10 for that 75 percentile range? Isn't that true that it moves it
11 outside that 75 percentile range?

12 A. Yes. I mean, I certainly wasn't worried about the results
13 when I ran the models. I thought the imputation model was the
14 best way to do it, so that was the model I ran.

15 Q. Okay.

16 A. But I think that just speaks to it's important to look at
17 the average across all of the metrics. So any individual
18 metric will be a little bit noisy, so I certainly wouldn't
19 declare a plan to be a partisan gerrymander based on one
20 efficiency gap value of negative .1 in isolation.

21 Q. Now, Professor, I'd like to just turn now to the equation
22 that you used to compute the efficiency gap, so I think that
23 appears on page eight of your report. Let's grab that equation
24 and the paragraph below it. There we go.

25 So, Professor Warshaw, can you describe what this equation

1 is doing?

2 A. Sure. This equation, in order to calculate the efficiency
3 gap at the statewide level and take into account variation in
4 turnout, the best equation to use is to use the seat margin of
5 each party, which is their seat share minus .5, and then
6 subtract -- so in this case, the Democrats' seat margin -- and
7 then subtract from that two times their vote margin, and that
8 yields an estimate of the efficiency gap that takes into
9 account variation in turnout across districts.

10 Q. Okay. And for purposes of that vote margin, are you
11 counting raw votes or percentages of vote?

12 A. I aggregate all of the votes up to the state level, the raw
13 votes rather than the percentages, and that's what takes into
14 account the variation in turnout. So then I calculate the
15 percentage at the statewide level based on the raw votes for
16 each party in each district.

17 Q. And when was this -- and why -- is there a -- turnout
18 vary --

19 In the original formulation of the efficiency gap, wouldn't
20 you agree with me that turnout, unequal turnout, can affect the
21 calculation of the efficiency gap?

22 A. Well, the initial version of the efficiency gap didn't
23 take -- it didn't really take turnout into account; it just
24 looked at the vote percentage in each district and,
25 essentially, assumed equal turnout. And so this is why, in

1 2017, in a peer-reviewed article in 2017, Eric McGhee developed
2 this adapted version of the efficiency gap that takes into
3 account variation in turnout. And I think in all of his
4 subsequent work this is what he's used and he recommends and I
5 agree with that.

6 Q. And how do you know that this formula controls for
7 variation in turnout from district to district?

8 A. Well, it can be mathematically shown that it does, which is
9 what Professor McGhee does in his 2007 *Election Law Journal*
10 article. I think he presents the mathematical proof.

11 Q. All right. Now, you're not an expert in mathematics, are
12 you?

13 A. Well, I'm an expert in statistics, which obviously uses a
14 lot of math. I wouldn't claim I'm a mathematician, but I do
15 think I'm an expert in statistics. But the article is just
16 based on -- again, was peer reviewed, which means it passed,
17 you know, scientific standards.

18 Q. Now, where you multiply, you have the seat share less
19 twice, or two times the, vote margin. Why do you multiply the
20 vote margin by two?

21 A. Because this is simply what the initial wasted votes -- if
22 you assume equal turnout across districts, this is exactly what
23 the initial efficiency gap formula implies. But I think
24 implicit in the efficiency gap is an assumption that the
25 historical norm of a two-to-one relationship between seats and

1 votes, which is the vote-seat curve that historical U.S.
2 elections have observed, is a reasonable benchmark. And that's
3 what this formula reflects.

4 Q. Okay. So stated more generally, then, is that the
5 implication of this formula that for every percentage increase
6 in a party's vote margin, the party's expected to receive a two
7 percent increase in seat margin?

8 A. Exactly.

9 Q. Is that term called a "swing ratio" in political science?

10 A. Yes, that's one of the terms that people use for that.

11 Q. Okay. So if we assume a perfectly symmetrical seat-vote
12 curve but with a swing ratio that is greater than two, meaning
13 that for every percentage increase in the vote margin the party
14 receives greater than two percent increase in the seat margin,
15 that efficiency -- the resulting efficiency gap would not be
16 zero under this formula; correct?

17 A. That's true.

18 Q. So that means that if the true swing ratio is larger than
19 the two that's assumed in this formula, wouldn't that amplify
20 the efficiency gap of a plan?

21 A. It could, but, again, two things -- I say two things in
22 response. First is that the two-to-one swing ratio is the
23 historical norm in U.S. elections. This just reflects the
24 history of the United States.

25 And secondarily, to the extent that, you know, different

1 states could have small variations around that natural
2 vote-seat curve, you know, as I emphasized repeatedly, no
3 metric is perfect and that's why we should look to multiple
4 metrics.

5 Q. Okay. Now, Professor Warshaw, in your rebuttal report you
6 cite to a 2018 *Stanford Law Review* article authored by
7 Professors Stephanopoulos and McGhee entitled "The Measure of a
8 Metric"; do you not?

9 A. Yes.

10 Q. Okay. And do you consider that work a reliable authority
11 on the efficiency gap?

12 A. Well, it's not peer reviewed, so it hasn't been judged by,
13 you know, a reviewing panel of its peers. However, in my
14 evaluation of an article, the analysis there matches what I've
15 independently done for the analyses that I've replicated, so I
16 think that I view it as reasonably reliable with the caveat
17 that it hasn't been peer reviewed.

18 Q. Sure.

19 MR. LEWIS: Okay. Let's go ahead and pull up on the
20 screen the three. All right.

21 Professor Warshaw, I'm going to provide you and counsel and
22 the Court with copies of the article that we've just discussed.

23 May I approach, Your Honor?

24 JUDGE BLACK: Yes. Thank you.

25 MR. LEWIS: The nameplate survived.

1 JUDGE BLACK: I'm still looking for that other guy.

2 MR. STRACH: We're going to send him back to North
3 Carolina.

4 Q. All right. Professor Warshaw, do you recognize what I've
5 handed you as the 2018 article in the *Stanford Law Review*
6 authored by Professors Stephanopoulos and McGhee entitled "The
7 Measure of a Metric: The Debate Over Quantifying Partisan
8 Gerrymandering"?

9 A. Yes, I do.

10 Q. And this is the article that you cited in your rebuttal
11 report dated November 26, 2018?

12 A. Yes.

13 Q. I'd like for you now to please turn to page 1534 of this
14 article. And, specifically, I'd like to direct your attention
15 to that second paragraph. We can leave the zoom where it is.

16 Do you see where Professors Stephanopoulos and McGhee
17 write, quote, "The fit is not *perfect* - at both electoral
18 levels, historical responsiveness has been slightly higher than
19 2"?

20 A. Yes.

21 Q. So is that problematic to you that the authors of the
22 efficiency gap have acknowledged that responsiveness has been
23 slightly higher than two historically?

24 A. Well, the previous two sentences read, "The charts also
25 include a seat-vote line with a slope of 2," and "In both

1 cases, the points cluster quite tightly around this line."

2 So I think the point of this analysis, which my own
3 independent analysis confirms, is that the -- the historical
4 vote-seat relationship is quite close to two. I actually think
5 if you look at more recent elections, theirs looks at the long
6 term, which is actually ever so slightly less than two. But
7 regardless, it does cluster tightly around two, which both
8 their analysis and my own independent analysis confirm.

9 Q. Okay. But at the end of the day --

10 JUDGE WATSON: Are we there yet?

11 (Laughter.)

12 MR. LEWIS: Soon.

13 Q. The variation in that swing ratio, that assumes a swing
14 ratio of a two is ultimately an assumption that you're applying
15 in the efficiency gap; is it not?

16 A. It's one of the -- I think the efficiency gap has multiple
17 foundations. The first foundation is simply that of the
18 foundation around wasted votes. But then that corresponds --
19 the way the wasted votes formula is developed corresponds to
20 this two-to-one swing ratio.

21 So, again, like in my view, the historical swing ratio is
22 quite close to two. You know, you would never expect it to be
23 exactly two. But, overall, the efficiency gap does reflect the
24 historical relationship between votes and seats in U.S.
25 elections.

1 And you can -- if you turn to the next page of their
2 report, on 1335, you can just see -- or 1535, you can see this
3 visually, that clearly the dots tightly cluster around the
4 two-to-one vote-seat curve.

5 MR. LEWIS: Your Honors, this is sort of a natural
6 break point in my cross. We may want to consider taking a
7 lunch break and finishing after lunch.

8 JUDGE BLACK: How long do you anticipate your
9 continued cross will be?

10 MR. LEWIS: Less than one hour.

11 JUDGE BLACK: I think it would be unfortunate to make
12 you continue your cross at this time with the duration of your
13 cross interfering with the panel's lunch.

14 (Laughter.)

15 JUDGE BLACK: Accordingly, I agree with your
16 proposition.

17 We'll break now. We'll break for an hour and five minutes
18 and be back at 1:00 o'clock and continue.

19 During the break the witness will not discuss his
20 testimony. And he understands that; correct?

21 THE WITNESS: Yes, Your Honor.

22 JUDGE BLACK: Very well. We're on break until 1:00.

23 COURTROOM DEPUTY: All rise. This court is in recess
24 until 1:00 o'clock.

25 (At 11:56 AM, a luncheon recess was taken.)

AFTERNOON SESSION

(In open court at 12:59 PM.)

(Christopher Warshaw resumes the witness stand.)

JUDGE BLACK: Thank you. You may be seated.

We're apparently back from recess, although I define recess differently.

Plaintiffs' counsel is here. Defendants' counsel is here. The intervenors' are here. The witness is on the stand.

You remain under oath. And you understand, sir?

THE WITNESS: Yes, Your Honor.

JUDGE BLACK: Very well. You may continue your cross-examination.

MR. LEWIS: Thank you, Your Honor.

CROSS-EXAMINATION (Continued)

BY MR. LEWIS:

Q. Professor Warshaw, I'd like to switch gears with you now and talk a little bit about some of the other partisan bias metrics that you evaluate in your report.

MR. LEWIS: And can we go ahead and pull up PD74. Okay.

Q. Now, Professor Warshaw, you calculate the mean-median difference for Ohio for each year from 2012 to 2018; correct?

A. Yes.

Q. Well, Professor, does the mean-median difference measurement account for political geography?

1 A. No.

2 Q. Does the measure allow you to account for incumbency
3 protection?

4 A. No.

5 Q. Does the measure allow you to distinguish between any
6 partisan bias due to gerrymandering versus factors other than
7 gerrymandering?

8 A. No, not looking at it in isolation.

9 Q. Would you agree with me that packing and cracking can occur
10 in a districting plan in a manner that does not affect the
11 mean-median measure?

12 A. Yes. I think I stated that in my report.

13 Q. Would you further agree with me that this metric can't tell
14 us how many seats a party gains through partisan bias in a
15 district plan?

16 A. Yes. I think I also stated that in my report, although you
17 can -- you can get a rough approximation of it actually by
18 looking at the actual distribution of seats, but it takes a
19 little bit more effort than it does than the efficiency gap.

20 Q. And would you agree with me that the mean-median analysis
21 you conducted in this case does not measure if a specific
22 district in Ohio's plan was drawn with discriminatory partisan
23 intent?

24 A. Yes. It's not a metric designed to look at specific
25 districts.

1 Q. Okay. And, likewise, would you agree with me that the
2 mean-median difference analysis you conducted in this case does
3 not tell us if a plan exhibited a discriminatory partisan
4 effect on voters in any specific district?

5 A. That's correct.

6 Q. And do you have a bright line number for a mean-median
7 measure beyond which you would consider a plan a gerrymander?

8 A. No. Just like the efficiency gap, I would look at its
9 level of extremity relative to the historical distribution of
10 mean-median differences and look for historical outliers.

11 Q. All right. Just turning briefly to the declination, when
12 was the declination metric first proposed in the literature?

13 A. I believe it was proposed in 2017 by a mathematician at the
14 University of Vermont named Gregory Warrington.

15 Q. Okay.

16 A. And that was subsequently published in a peer-reviewed
17 article in the *Election Law Journal*.

18 Q. Okay. And would you acknowledge that the declination
19 metric has not been subject to a broad critique in the academic
20 community?

21 A. I think that's -- I think that's fair. I think it's a
22 newer metric, but I'm not aware of any wholesale critiques of
23 it.

24 Q. All right. And in your report is it fair to say you
25 describe the declination as being a similar concept to the

1 efficiency gap?

2 A. Yes. I think they're both trying to Kaptur the underlying
3 partisan bias or advantage in a districting plan and they're
4 quite closely related empirically.

5 Q. All right. Would you agree with me that the analysis you
6 conducted in this case using the declination metric can't tell
7 us how many seats a party gains through a partisan bias in a
8 district plan?

9 A. That's correct. The declination is not designed to tell us
10 a specific number of seats; it's simply designed to be an
11 indicator of partisan bias and it's designed to be very easily
12 comparable across states and across time.

13 Q. Okay. And would you agree with me, Professor Warshaw, that
14 the declination analysis you conducted in this case would not
15 be able to tell us if a specific district in a district plan
16 was drawn with discriminatory partisan intent?

17 A. Yes, that's correct.

18 Q. And would you likewise agree with me that the declination
19 analysis you conducted in this case would not be able to tell
20 us if a plan exhibited a discriminatory partisan effect on
21 voters in a specific district?

22 A. That's correct. It's a statewide metric.

23 Q. And does the declination metric control for turnout
24 variation between districts?

25 A. I don't -- I don't believe so, no.

1 Q. Now, Professor Warshaw, you used two symmetry metrics. You
2 have symmetry and then the symmetry with the counterfactual
3 50-50 breakdown. Do you see that?

4 A. Exactly. And that mirrors the work that Gary King and his
5 coauthors have done, especially his work with Andrew Gelman.

6 Q. I'd like to turn briefly to page 16 and Figure 2 of your
7 initial report. So tab 1 in the binder and P571 for the
8 exhibit.

9 Now, Professor, I understand this is from your
10 responsiveness analysis, but is this plot reporting that 50-50
11 symmetry metric?

12 A. Yes, that's another metric that you could derive from this
13 plot.

14 Q. Okay.

15 A. Even though it's not exactly -- as you're saying, that's
16 not how it was designed, but --

17 Q. I was just looking for a nice way to describe it based on
18 what you -- so we didn't have something -- something a little
19 different than just a number. That's --

20 A. Yes.

21 Q. So it's fair to look at it for that purpose?

22 A. Yes.

23 Q. Okay. This is an initial question. In Figure 2 at the
24 bottom, you're indicating that if the Democrats only had a vote
25 share of 20 percent, that they would have one seat; correct?

1 A. Yes, that's right.

2 Q. Do you happen to know which seat that might be?

3 A. I don't. I mean, it was the seat we discussed earlier, I
4 think, where the vote share was above 80 percent in two of the
5 elections and then it was uncontested perhaps in one. I don't
6 remember which seat number that is.

7 Q. Okay. If I told you that was the 11th Congressional
8 District, would that --

9 A. I'd still need to see it in front of me.

10 Q. Okay.

11 A. I trust you're telling the truth, but, yeah.

12 Q. Okay.

13 A. I still don't know it by heart.

14 Q. All right. Now, would you agree with me that Democratic
15 congressional candidates have never achieved a 50 percent or --
16 well, that the Democrats have never achieved a 50 percent or
17 better vote percentage in Ohio's congressional elections from
18 2012 onward?

19 A. Correct. They did during the previous decade, which is why
20 that's reflected in the blue area here, but they haven't since
21 2012.

22 Q. Okay.

23 A. Or since the new plan went into place.

24 Q. Okay. Professor, does this -- and what we're using this
25 plot for is that counterfactual 50-50 symmetry measure;

1 correct?

2 A. Correct.

3 Q. Okay. And does that metric control for political
4 geographic differences?

5 A. No.

6 Q. Does that metric control for incumbency protection?

7 A. No. It's like the other metrics. It's simply trying to
8 Kaptur partisan bias in the districting process. It's not
9 trying to account for other potential things that we might want
10 to characterize.

11 Q. Okay. So then isn't it possible that some, if not all, of
12 a -- of any asymmetry in -- reported in the counterfactual
13 symmetric 50-50 metric is attributable to factors other than
14 intentional partisan gerrymandering?

15 A. Sure. But as I talked about earlier, this was -- this
16 symmetry metric was more pro Republican in 2012 than 97 percent
17 of previous congressional elections. So I think in order to
18 believe that, you would have to think the geography, the
19 underlying geography or incumbency protection in Ohio was
20 different than 97 percent of previous elections, which seems
21 unlikely to me. I think the much more likely explanation is
22 that this was the result of the -- of the intent to draw a
23 partisan gerrymander.

24 Q. And at what percentage -- so you say it's 97 -- it's more
25 Republican than 97 percent of plans. What's that percent -- is

1 there a percentage point at which you would no longer believe
2 that it is the result of intentional gerrymandering?

3 A. There's no bright line that I can point to.

4 Q. So 90 percent may or may not be enough?

5 A. I think what I would -- I think all I can say is that if
6 you're looking across the metrics on average, I think that if
7 it was more than about 90 percent -- if it was more in favor of
8 one party than about 90 percent of previous maps, I think that
9 would be very indicative of a partisan bias looking across the
10 different metrics. But I don't have -- I don't have a bright
11 line for any particular metric.

12 Q. And even the metrics combined is -- you have not offered
13 the opinion in your report that 90 percent is the value beyond
14 which a plan is a gerrymander; correct?

15 A. No. I think for me that would just be indicative. It
16 still wouldn't be a bright line that would make -- that I would
17 think it's dispositive, but it would be indicative of one.

18 Q. Okay. And would you agree with me that the partisan
19 symmetry analysis you conducted in this case, whether using the
20 counterfactual symmetry metric or the other symmetry metric you
21 use, would either of them allow you to determine if a specific
22 district was drawn with discriminatory partisan intent?

23 A. No. These are both statewide metrics, so they don't enable
24 you to characterize a particular district.

25 Q. And, again, with respect to those two metrics, the two

1 symmetry metrics, would you agree with me that the analysis you
2 conducted in this case using those metrics would not be able to
3 tell us if a plan exhibited a discriminatory partisan effect on
4 voters in a specific district?

5 A. No. It could be the same answer. These are statewide
6 metrics. They're not designed to characterize a particular
7 district.

8 Q. Now, your report provides an analysis of responsiveness and
9 competitiveness in Ohio's congressional plan. I'd like to talk
10 a little bit, first, about your responsiveness analysis.

11 So to make sure we're working with the most recent data,
12 I'd like to turn to page 14 and Figure 10 of your supplemental
13 report. So that's P476 or tab 3 in the binder.

14 Okay. So in this particular chart how are you defining the
15 level of responsiveness of a plan?

16 A. So this is based on counterfactual uniform vote swings that
17 would lead to a vote share in the average district between 45
18 and 55 percent. So what we see is how does the number of seats
19 change for this -- or how does, say, the Democrats' seat share
20 change based on this ten percent vote-share change.

21 Q. Okay. And like other aspects of your analysis in this
22 case, is it true that you only consider for this analysis those
23 states that have at least seven districts in their
24 congressional district plan?

25 A. Yes.

1 Q. And have you performed an analysis of responsiveness where
2 you consider states with six or less congressional districts in
3 their plan?

4 A. I think I calculated it, but I didn't report it for all of
5 the analyses in my --

6 In my reports, I focus on states with more than six
7 districts, just for consistency.

8 Q. Okay. Now if the plan -- why does the responsiveness --
9 you would agree with me then that the responsiveness in Ohio's
10 congressional plan from 2012 to 2018 varied from election to
11 election; correct?

12 A. It did a bit using this metric, yes.

13 Q. Okay. And the vertical line, dashed line, right around --
14 just slightly less of .2, that's the average level of
15 responsiveness from 1972 to 2018; correct?

16 A. Yes.

17 Q. All right. So if your plan is to the right of the line,
18 that means you're more responsive than the historical average;
19 correct?

20 A. Yes, using this metric.

21 Q. Got it. Okay. So wouldn't you agree with me that the 2012
22 plan was more responsive than the historical average in 2018?

23 A. I would, using this metric, but I can -- the reason for
24 that is because this metric goes from 45 to 55 percent, which
25 is what I calculated just for consistency with the literature.

1 But as we talked about earlier, Democrats have never actually
2 gotten above 50 percent. In this plan, they haven't gotten
3 more than 50 percent of the vote share. So all of the seat
4 swing in this responsiveness evaluation occurs with more than
5 50 percent vote share for Democrats, which hasn't actually
6 occurred during this redistricting period. So in some ways,
7 like, the responsiveness here is all kind of hypothetical, that
8 if Democrats would get more than 50 percent, seats might shift.

9 But, remember, these responsiveness metrics are trying to
10 give us an indication of the durability or insulation of a
11 plan. And what we've actually observed in real life is that
12 despite a range of different election results where Democrats
13 have gotten anywhere from around 40 to 48 percent of the
14 two-party vote share, their seat share hasn't actually changed.
15 So, indeed, this plan does seem to be insulated against changes
16 in voters' preferences in the range of election results we
17 actually observe in Ohio.

18 Q. Your understanding is that these values would change if
19 Democrats had, in fact, achieved a greater than 50 percent vote
20 share in a two-party vote in Ohio in 2018; correct?

21 A. Exactly. I think that's what this metric is telling us.
22 If Democrats had gotten, you know, 52 percent of the vote, then
23 that would have been fairly responsive, although it still would
24 have displayed a large bias against Democrats with the -- for
25 instance, the graph in Figure 8 shows that even if Democrats

1 had gotten 55 -- it would have taken 55 percent of the vote in
2 2018 for Democrats to win half the seats. And if Democrats had
3 gotten 51 percent of the vote, they still would have received
4 far less than half the seats.

5 Q. Now, although you report those numbers as percentages,
6 there are only 16 seats that one can Kaptur; right?

7 A. Yes, that's true.

8 Q. Okay. So every seat reflects approximately -- what? One
9 divided by 16 is about what, six and a quarter?

10 A. That sounds about right.

11 Q. Okay. So every time -- so you get two seats. That's about
12 12 and a half percent; right?

13 A. Exactly.

14 Q. Okay. And, in fact, on Figure 8 on page 12, I believe your
15 testimony was that if Democrats got to 55 percent of the vote
16 share, that they would get half the seats; right?

17 A. Exactly. So they would -- I projected they would win eight
18 seats if they were to win 55 percent of the vote share.

19 Q. And due to that natural clustering or that natural packing
20 phenomenon that we talked about earlier, is it a total surprise
21 that in a system where you have single-member districts, that a
22 party might have to win slightly more than 50 percent of the
23 vote to Kaptur 50 percent of the seats?

24 A. Perhaps not, but I wouldn't characterize 55 percent as
25 slightly more than half of the vote. I mean, that would be a

1 ten-point margin between the parties, which is larger, for
2 instance, than in the wave election either in 2010 or '18 that
3 we observed at the national level.

4 So that would be the equivalent -- what you're essentially
5 saying is that to believe the geography is what's driving this,
6 you would have to believe that geography means that in order to
7 win even half the seats in Ohio, Democrats would have to have a
8 wave election in their favor larger than we've seen at the
9 national level in decades just to get half the seats in Ohio.
10 And I don't -- I don't know of any political scientist that
11 argues that geography has such large effects.

12 Q. Okay. Why don't we turn to page -- or PD73. Okay. Now,
13 Professor Warshaw, in -- you claim in your report that -- you
14 describe the GOP as narrowly winning the statewide
15 congressional vote in 2014 and 2016. Do you recall that?

16 A. In -- I don't recall them -- I don't recall saying that in
17 2014 and '16. I may have said that about 2012 and '18, but I
18 don't think I would have said -- if I said that about 2014 and
19 '16, then it was certainly an error.

20 Q. Okay.

21 A. Because those certainly aren't narrow statewide results. I
22 think they're competitive, which is what I might have said. I
23 characterize a statewide vote share between 40 and 60 percent
24 as potentially competitive at the statewide level, but I
25 wouldn't characterize it as narrow.

1 Q. Okay. Well, help me understand that then. Why don't we
2 turn to page 23 of your initial report. So 571, tab 1 in the
3 binder. Because you write on that first -- not the first full
4 paragraph but the continuation, you write, quote, "In 2014 and
5 2016, Republican candidates retained the same 75% share of
6 Ohio's seats, even while just narrowly winning the statewide
7 vote."

8 Do you see that, Professor?

9 A. I do, and I'll -- I'll own up. I think I misspoke there.
10 I think that's wrong and those were not narrow victories.

11 Q. Now, Professor, just taking a step back, do your
12 responsiveness metrics, your -- strike that.

13 In general, Professor, is it fair to say that your
14 responsiveness metrics just look at whether the candidate that
15 wins the election is a Republican or a Democrat; correct?

16 A. That's correct, yeah. Yes.

17 Q. Okay. So it wouldn't -- I'm sorry. Okay. I didn't mean
18 to speak over you, Professor. I'm sorry.

19 So that -- that metric is not sensitive to any within-party
20 variation between different types of Republican or Democratic
21 candidates; correct?

22 A. That's correct.

23 Q. So, for example, if you had a moderate Republican versus a
24 conservative Republican, that type of variation would not be
25 captured in your response metrics; correct?

1 A. Well, it would be partially captured because the statewide
2 vote share would also -- it would be reflected in the vote
3 share as well as the seat share. So I don't think it's
4 entirely true that it wouldn't be reflected at all, but it
5 probably wouldn't be entirely reflected.

6 Q. Well, how would the voter seat share be affected if a
7 particular district is represented by a more moderate
8 Republican versus a more conservative Republican?

9 A. Well, to the extent that -- well -- sorry. For purposes of
10 elections it might be reflective. Maybe you're talking about
11 something else. Maybe I misheard you, so I'm sorry.

12 Q. Okay. Right. I was just looking at sort of where --
13 responsiveness -- I think. Okay. I think I understand where
14 we're going. Okay. I apologize for that.

15 Isn't it true that if a -- that even if a congressional
16 representative in a safe district, in a district where you
17 would view it as not responsive or competitive, wouldn't that
18 representative still have to be responsive to their voters'
19 concerns to avoid a challenge at the polls?

20 A. Not necessarily. I mean, certainly not opposite party
21 voters. Because they, in an uncompetitive district, would be
22 very unlikely to lose the general election. It's possible
23 they'd have to be responsive to primary voters. But even
24 there, I think what -- what we know empirically is that
25 within-party responsiveness to voters who have a preference is

1 pretty modest.

2 Q. Okay. Let's turn to competitiveness. Now, Professor, you
3 use a pretty specific definition of competitiveness; right?

4 It's that an election with a winning party has 55 percent or
5 less of the vote; correct?

6 A. Exactly.

7 Q. Okay. At 55 to 45, you're in that range, you're
8 competitive under your analysis; correct?

9 A. Exactly.

10 Q. Now, on Table 4 of page 14 of your report -- and let's see
11 if we can get there. Okay. Table 4 of page 14, you attempt to
12 correlate measures of partisan bias in states with more
13 competitive elections; correct?

14 A. Exactly.

15 Q. And here you use a competitiveness measure between 40 and
16 60 percent; correct?

17 A. Exactly. I mean, here I'm trying to -- it's a different
18 thing I'm trying to characterize. This isn't trying to
19 characterize any particular election like I am in the other
20 metric. I'm simply trying to look at states where the --
21 really that aren't, like, dominated entirely by one party would
22 be a different way -- it probably would have been a more artful
23 way of saying this. I wasn't trying to necessarily say
24 competitive states. It was more states that are not one-party
25 states like, say, you know, the south in the 1970s and '80s for

1 Democrats.

2 Q. Okay.

3 A. Because I want to be clear that in those states, certainly
4 the metrics do diverge a little bit more, in states that are
5 really dominated by one party.

6 Q. Okay. All right. And my last question on this table
7 before we move on is, now you conclude here that there's a high
8 correlation between all these different -- all five of your
9 partisan metrics; correct?

10 A. Yes.

11 Q. Okay. And you believe that those five metrics are both
12 theoretically and empirically correlated; correct?

13 A. Yes.

14 Q. Okay. So returning to competitiveness briefly, I'd like to
15 turn to Figure 9 on page 13 of your report -- of your
16 supplemental report, excuse me. Plaintiffs' 476 or three in
17 the binder.

18 All right. So, Professor, this Figure 9 appears to show
19 the proportion of competitive congressional elections in each
20 state from 1972 to 2018; correct?

21 A. Yes, that's correct.

22 Q. Okay. And the vertical line that is sort of between the .1
23 and .2, that represents the average over the period; correct?

24 A. Yes, that's right.

25 Q. Okay. Now, using this kind of competitiveness, isn't it

1 fair to say that in two out of four of the elections held under
2 the 2012 congressional plan that Ohio's plan was relatively
3 average in its competitiveness compared to the nation as a
4 whole?

5 A. I think that's fair. If you look across the plan as a
6 whole, I think it's certainly less competitive than the nation
7 as a whole, if you look across the four elections. But
8 certainly 2012 and '18 were not substantially below the
9 historical average.

10 Q. Sure. 2014 and 2016, though, I think, isn't it --

11 A. Sorry, 2012 and '18 I meant to say. I'm sorry.

12 Q. No problem. Those 2014 and 2016 elections that you
13 indicate are not competitive, weren't those really strong years
14 for Republicans in congressional elections?

15 A. They were. So I think, you know, if I could conjecture
16 what happened with the map, the mapmakers likely cracked the
17 districts here such that Democrat -- or Republicans were
18 expected to win by around -- with around 55ish percent of the
19 vote, maybe a little bit more than that. And so in these wave
20 years for Republicans, then those districts became more
21 Republican and none were competitive. And in the wave year and
22 good years for Democrats, those districts that were designed to
23 be around 55 percent for Republicans became a little more
24 competitive, but on the whole, on average, they were like right
25 on the bubble of competitiveness and, on average, were expected

1 not to be competitive.

2 Q. And when you describe the analysis you just provided as
3 conjecture, what does that mean to you?

4 A. I can't rigorously point to something in my report, but,
5 you know, thinking about what would explain the pattern that we
6 see here and connecting the dots with the other parts of my
7 report.

8 Q. Well, you have not provided an empirical analysis to
9 support the conjecture that you've just given here today;
10 correct?

11 A. That's correct.

12 Q. Okay. And would you agree with me that Ohio's -- degree of
13 competitiveness in Ohio's congressional plans have, you know,
14 skipped around quite a bit dating, frankly, all the way back to
15 1990, at the least?

16 A. Yes.

17 Q. Okay. I'd like to return briefly to our discussion from
18 this morning about partisan intent. And you focus on one-party
19 control of the redistricting process as being a, you know, a
20 criteria that you point to for partisan bias.

21 A. Where are you? I'm sorry.

22 Q. Well, I'm just -- I'm talking more generally. We can go
23 back, if you prefer to go right out of the report, we can go to
24 page 16 of your primary report, which is, I think, where you
25 start your discussion.

1 A. Great. Thanks.

2 Q. Sure. And did you study -- well, let me start here. While
3 this may seem like a blindingly obvious question, please, you
4 know, bear with me. So what's the causal mechanism by which
5 you believe unified-party control of state government affects
6 the degree of partisan advantage?

7 A. When you control -- when you can pass a redistricting plan
8 without support from the other party in a unified government,
9 then you can draw the map such to convert your party's votes to
10 seats as efficiently as possible, usually via cracking and
11 packing.

12 Q. And is it fair to say that for your analysis that you added
13 this one-party control requirement to your -- well, let me take
14 a step back.

15 And just so that we're clear, your position is that for a
16 plan to be a partisan gerrymander, not only must your partisan
17 metrics favor a specific party and not only must those metrics
18 be considered outliers, but the benefited party must also be
19 the party in control of the redistricting process; correct?

20 A. I think that's foundational in that definition of a
21 gerrymander is you have to be able to demonstrate partisan
22 intent. I mean, I suppose there could be a very unusual case
23 where there was, like, an independent governor or something
24 that leaned toward one of the parties, but yes, I think in
25 general.

1 Q. Okay. And is it fair to say that you require this
2 one-party control element because your partisan bias metrics
3 standing on their own are not sufficient to identify a
4 so-called partisan gerrymandered map; correct?

5 A. Well, I think I've tried to be clear about their metrics of
6 partisan bias. On their own, they don't -- they're not
7 dispositive for -- that it's a gerrymander, so you have to
8 connect the effect of partisan bias here with intent, and the
9 intent we can infer from the unified control of the government.

10 Q. Would it matter to your analysis if a redistricting plan
11 passed on a broad bipartisan basis?

12 A. I think that if the vast majority of the members of the
13 minority party supported it, it's possible, but I don't know of
14 cases like that. And, in general, I think as I talked about
15 during the direct testimony, the party that controls the
16 redistricting process has a great deal of power over what's
17 going to pass. So you would expect -- you'd always expect some
18 minority members to vote for it, either for idiosyncratic
19 reasons because the bill was packaged with other bills, or for
20 reasons of trying to carve out something in their own district.

21 Q. And so, for example, if a majority of the minority party of
22 one of the Houses of the Ohio General Assembly voted for the
23 plan, wouldn't that have an impact on your results, on your
24 analysis?

25 A. No. It would still be unified control of government where

1 it's pretty clear that the party that controls the government
2 has the power to draw the map and potentially package it with
3 other things to attract minority party support. But I don't
4 think that would be relevant for determining whether it was a
5 gerrymander.

6 Q. And have you performed any empirical research to support
7 that, your conclusion in this case?

8 A. No. To my knowledge, the consensus in political science is
9 that political scientists define a gerrymander based on whether
10 there's unified control of government, and I don't know of any
11 academic study that's tried to tally up roll call votes.

12 Q. Okay. And to be clear, for purposes of forming your
13 opinions and writing your report in this case, you didn't study
14 the process by which Ohio adopted House Bill 369; correct?

15 A. No. And that's because, again, I don't think that's
16 relevant. If there was unified control of government, I
17 wouldn't look to the roll call voting pattern for the details
18 of the bill passage as important pieces of indicators.

19 Q. Okay. I'd like to briefly return to PD74 just for a
20 moment. Now, in your analysis to conclude that a plan is a
21 partisan gerrymander, you require -- how many of these partisan
22 metrics have to be an outlier for a plan to be a partisan
23 gerrymander under your analysis?

24 A. Well, I think what I said, they all have to favor the party
25 that drew the map and point in the same direction, and then

1 looking at the average across the metrics, I would want it to
2 be an outlier. I think there could always be a case where, you
3 know, one metric might not be as much of an outlier as others.
4 But I think looking holistically across the measures you would
5 want it to be an outlier in order to classify a plan as a
6 gerrymander.

7 Q. So each measure has to be an outlier, or through some
8 calculation all five averaged together have to be an outlier?
9 Which is it?

10 A. The latter.

11 Q. The latter, okay. And not to belabor what we've discussed
12 about at length today already, but in your report you don't
13 provide a specific value beyond which the plan is presumed for,
14 you know, an outlier, beyond which the plan is presumed to be a
15 gerrymander; correct?

16 A. No. Again, I think that the Michigan plan -- or the Ohio
17 plan here is such an outlier that when you're more extreme than
18 99 percent of the historical plans, you know, we don't have
19 to -- I don't have to draw a bright line below that.

20 Q. Okay. Now, for 2010, which -- you understand that 2010
21 existed under the prior congressional plan; correct?

22 A. Yes, that's true.

23 Q. Okay. And would you agree with me that in 2010, that
24 several of your partisan bias metrics would not, in your view,
25 be an outlier?

1 A. Sorry, in 2010?

2 Q. In 2010, yes.

3 A. Yes, certainly looking holistically across them, I wouldn't
4 classify 2010 as an outlier.

5 Q. Okay. And, in fact, I believe you testified yesterday that
6 you viewed the mean-median difference, in particular, in 2010
7 as very modest; correct?

8 A. Exactly.

9 Q. Okay. So therefore you'd agree with me, then, that the
10 plan in effect in 2010 was not a partisan gerrymander under
11 your analysis; correct?

12 A. Well, I don't -- I don't think I have a -- how do you put
13 this? I think certainly the metrics that we have in front of
14 us are not indicative of a partisan gerrymander.

15 Q. Thank you. All right.

16 I'd like to turn now to your discussion of political
17 polarization. How long has political polarization been on the
18 rise in America?

19 A. I would say since the early '70s. Political polarization
20 reached its minimum in the early '70s and it's been increasing
21 steadily since then. Yeah.

22 Q. And do we find political polarization in bodies other than
23 the U.S. House of Representatives?

24 A. Yes. All legislative bodies in the United States are
25 increasingly polarized.

1 Q. So, for example, the United States Senate, would you
2 consider the United States Senate to be increasingly polarized?

3 A. Yes.

4 Q. Now in section 9.3 of your initial report, beginning at the
5 bottom of page 37 and carrying over to page 38, so that's P571
6 or tab 1 in the notebook --

7 A. Uh-huh.

8 Q. There we go. -- you describe -- and I'm reading that text
9 at the bottom of page 38, but we'll keep both pages on the
10 screen so you can see the whole thing.

11 A. Sure.

12 Q. You indicate that, quote, "In the most recent Congresses,
13 comma, a ten percent pro-Republican shift in the efficiency gap
14 is associated with a .095 shift to the right in a DW-Nominate
15 score."

16 Do you see that?

17 A. Yes, I do.

18 Q. So if we round that up to a .1, is that then suggesting --

19 MR. LEWIS: Let's do this. Let's go back to 37 and
20 Figure 15. And if we could zoom in on that left chart. There
21 we go.

22 Q. So do I read that -- do I read your analysis correctly that
23 if we have a ten percent change in the efficiency gap, that the
24 average DW-Nominate score would change by a margin of nearly .1
25 on this scale?

1 A. Yes, that's exactly right.

2 Q. Okay. I wanted to make sure my scales were right before we
3 went any further here.

4 Okay. So you indicate -- you've testified that the Ohio
5 efficiency gap changed from 2010 to 2020 (verbatim) by a margin
6 that exceeded ten percent; is that correct?

7 A. Yes. I can't read the exact number, but yes.

8 Q. Okay. So is it then fair to say that we would expect that
9 the DW-Nominate score for Ohio members of Congress should
10 increase, then, between 2010 and 2012 by approximately .1?

11 A. I think somewhere in that ballpark, although the regression
12 is based on a nationwide analysis; it wasn't based on just
13 Ohio. So, of course, there will be a little bit of -- a little
14 bit of measurement error there.

15 Q. Okay. Do you see a .1 difference in the DW-Nominate scores
16 between 2010 and 2012 on this chart?

17 A. I do, in fact. It's hard to visualize, but what you can
18 see is that in -- the mechanism, remember, for this is that
19 there's fewer Democrats elected. So in 2012, in the little
20 tiny dots in the bottom, there are two fewer -- I think -- I
21 believe there were two fewer Democrats. So the -- I didn't --
22 I didn't draw a line here of the average DW-Nominate score
23 across parties because that wasn't what I was trying to show in
24 this graph. But I'm fairly confident that if I had drawn a
25 central line it would have shifted about .1 up.

1 Q. But you have not performed that calculation as you sit here
2 today, have you?

3 A. No, but I think that we can -- we can both look at this
4 chart and we could easily do the calculation and I'm fairly
5 certain that's what it would show. So I don't think the chart
6 here is at all inconsistent with the regression results at the
7 nationwide level.

8 Q. Well, you'd agree with me that there was very little change
9 in Ohio's congressional delegation from 2010 to 2012; right?

10 A. I can't remember the exact numbers, but it went from -- it
11 went from five to four Democrats or six to four. I can't
12 remember. But there was certainly a change.

13 Q. And in your report on the bottom -- on page 38, you talk
14 about that .095 difference as being a difference in the
15 ideologies of Senator Cornyn and Senator Graham; correct?

16 A. Yes.

17 Q. All right. And do you recall in that time frame
18 approximately what Senator Graham's DW-Nominate score actually
19 was?

20 A. I know when I originally wrote this paragraph, which I
21 wrote about a year ago, I consulted their DW-Nominate scores
22 quite closely and they were exactly, whatever the distance,
23 .095 apart.

24 Q. But you don't recall what the DW-Nominate score actually
25 was at the time?

1 A. I don't. I only know they were exactly .095 apart when I
2 wrote this.

3 Q. Okay.

4 A. And I think, just to put it qualitatively, Cornyn is one of
5 the leaders of the Senate, has consistently been quite
6 conservative. Graham, until the last year, was widely
7 considered one of the most moderate Republican senators. He
8 backed -- he almost voted for the cap-and-trade climate bill.
9 He's consistently backed compromises on immigration. So I
10 think in the last year he's become a little bit more
11 conservative as he's getting closer to his re-election in 2020.

12 But if you look over the past decade and compare Graham and
13 Cornyn, you know, it's easy to just sort of qualitatively pick
14 bills and see that Graham was one of the ones, you know,
15 looking to compromise with Democrats, whereas Cornyn was on the
16 right of his party.

17 Q. So then when you assess Senator Graham's conservatism or
18 political moderation, you're looking at more than just one
19 legislative vote; correct?

20 A. Oh, absolutely. I mean, the DW-Nominate score is
21 aggregating across hundreds of votes, and, indeed, it's
22 actually aggregating across their entire time in Congress. So
23 it's not even just looking at a single Congress, because what
24 we know is that Congresspeople basically take the same
25 ideological position with some modest changes over their entire

1 time in Congress. So you get a much more accurate picture of
2 any member of Congress' ideological positions by both
3 aggregating across all of their roll call votes as well as
4 aggregating across multiple Congresses.

5 Q. So you wouldn't want to just pick one -- one vote or one
6 issue in isolation; right?

7 A. Well, for purposes of looking at members of Congress who we
8 easily have data on hundreds of roll call votes, by looking at
9 hundreds of votes, we can get a very precise estimate of their
10 ideological positions. But I think what the examples I gave
11 you for Graham and Cornyn show is that, because congressional
12 roll call voting lies in one dimension. Most of the issues you
13 would cherry pick might -- or you might pick would -- would
14 support the general one-dimensional positions from the
15 DW-Nominate scores, and that's because roll call voting in
16 Congress is so one dimensional.

17 Q. So speaking of that, turning to the next page, page 39,
18 this is where you provide an analysis of partisan
19 gerrymandering in connection with the Affordable Care Act
20 repeal; correct?

21 A. Yes.

22 Q. And here you're examining the relationship between roll
23 call voting in Ohio's preferences on the repeal of the
24 Affordable Care Act; right?

25 A. That's correct.

1 Q. And the data you leveraged for this analysis, it was a
2 survey from 2016; is that correct?

3 A. Yes, I believe that's right.

4 Q. Okay. Now, you'd agree with me that healthcare is a very
5 polarizing issue in the United States, wouldn't you?

6 A. Well, I think it's both polarizing, but it's been the most
7 salient issue of the past decade, and in politics usually
8 issues become more -- or are a little bit more polarized when
9 they become the most important issue as healthcare has been.

10 Q. So for your analysis in this case, why didn't you look at
11 multiple issues and why did you only instead look at, you know,
12 a highly polarizing issue like repeal of the Affordable Care
13 Act?

14 A. Well, what I've shown in my academic work is that public
15 opinion, just like congressional roll call behavior, lies along
16 one main dimension. So in modern American politics, Democrats
17 tend to hold liberal positions -- that hold liberal positions
18 in the Affordable Care Act also tend to hold liberal positions
19 on a range of other issues. And likewise, Republicans who
20 oppose the Affordable Care Act also tend to hold conservative
21 positions.

22 So what that means is that regardless of which issue I
23 examined, as long as it was a relatively salient issue that
24 people knew something about, I wouldn't expect the results to
25 look any different from the one here.

1 But unlike the congressional roll call data where the
2 DW-Nominate scores are very easily available and very easily
3 comparable, you know, it's harder to figure out how to
4 translate the -- do the analysis of the mass public in a way
5 that's digestible. The data isn't quite as easy to get and
6 then sort of display. So I picked healthcare because both --
7 as I said, it was -- because it was the most salient issue.
8 But then secondarily, just for data convenience issues, you
9 know, it would have taken a lot of time to do this kind of
10 analysis for a wide range of issues.

11 But I wouldn't have expected the results to differ if I had
12 done so, so I decided that just for economy reasons it made
13 sense to focus on one issue.

14 Q. So you can't tell us for sure, if you'd looked at a menu of
15 five or six policy positions, if your results would have
16 differed?

17 A. I can't tell you for sure, but based on my academic work
18 which finds that public opinion is one dimensional -- in other
19 words, lies along a main liberal/conservative spectrum just
20 like the roll call voting behavior in Congress -- I wouldn't
21 expect the results to differ across issues.

22 Q. So based on this analysis, then, doesn't your analysis
23 imply that Democrats, who live in what you term to be packed
24 districts, would be far more likely to agree with their member
25 of Congress?

1 A. That's -- that's right, if you were to think about it at
2 the districts level. But it turns out that there's more people
3 that live in cracked districts than in -- more voters live in
4 cracked districts than packed districts, is I think one thing
5 this suggests, this graph suggests. In other words, more
6 Democrats actually live in the 12 cracked districts than in the
7 four packed districts.

8 Q. Finally, you conduct an analysis in section 9.5 of your
9 report, beginning on page 41, where you purport to draw a
10 connection between what you consider partisan gerrymandering
11 and citizens trust in their representatives. And for this you
12 use a question that appeared in the 2014 CCES survey; is that
13 correct?

14 A. Yes, that's correct.

15 Q. Okay. And the specific question that was asked was quote,
16 "Do you trust your district's Representative in Congress to do
17 what's right"; is that correct?

18 A. Yes.

19 Q. Has that -- how often is that question asked in CCES?

20 A. To my knowledge, it hasn't been asked in other surveys, so
21 that was why I focused on this one particular survey, because
22 we just lacked data on -- and, obviously, I think it's a useful
23 and interesting question to ask, but to my knowledge it hasn't
24 been asked on other large-scale surveys.

25 Q. And had that survey question been -- been validated in the

1 political science literature so that we have a good idea what
2 it's actually measuring?

3 A. I can't answer that specifically, because I wasn't -- I
4 haven't looked at that. But I can say that the people that
5 design the -- that design the CCES are some of the top survey
6 methodologists in political science. So if a question is on
7 the common battery of questions that goes to all of the
8 respondents to the survey, then it's generally passed
9 scientific muster and is viewed by some of the top survey
10 methodologists in political science to be a valid question.

11 Q. Do you know why the question hasn't been asked since 2014?

12 A. They always rotate questions on and off the CCES for a
13 number of different reasons. You only have about ten or 15
14 minutes of time to ask respondents questions and so you can't
15 ask them everything that you might like.

16 Q. And you identify -- if we could turn now to page 42 of your
17 report. All right. And here you draw a -- you're showing the
18 relationship between the absolute value of the efficiency gap
19 and the survey -- the response to the survey question; correct?

20 A. Yes, that's right.

21 Q. Okay. First of all, overall, those are pretty -- pretty
22 low, in general, which, is it fair to say that Americans don't
23 seem to have very much confidence in their members of Congress
24 to do what's right?

25 A. I think that's fair to say.

1 Q. Okay. In fact, the highest observation appears to be less
2 than 40 percent?

3 A. I think that's right.

4 Q. Okay. And you're aware, Professor Warshaw, that there have
5 been redistricting lawsuits filed, for example, in both
6 Maryland and Virginia; right?

7 A. I don't think I knew there was a partisan gerrymandering
8 case in Virginia, but I certainly knew there was one in
9 Maryland.

10 Q. Sure. But you know there have been multiple racial
11 gerrymandering cases in Virginia; correct?

12 A. That's -- yes, I knew that.

13 Q. Okay. And you know that there was a partisan
14 gerrymandering case brought in Wisconsin; do you not?

15 A. Yes, I did know that.

16 Q. Okay. So these are just three observations right here.
17 Would you agree with me that in these cases you have pretty --
18 you know, pretty high level, relatively speaking, of
19 respondents saying that they trust their representative despite
20 allegations that -- or despite the presence of litigation
21 alleging that these plans are gerrymanders; correct?

22 A. Yes, that's right. And what I'm showing in this graph is
23 this national relationship between state -- between partisan
24 bias and trust in their representatives, but certainly there's
25 some states that are off the main line.

1 Q. And, in fact, the statistical significance that you're able
2 to show with this data set is only significant at the ten
3 percent level; correct?

4 A. That's correct. I mean, with only 23 states or 24 states,
5 whatever there are here, I don't think that's surprising.

6 Q. Yeah. And your report and analysis in this case does not
7 establish any causal relationship between the absolute
8 efficiency gap and the response to the CCES question; is that
9 correct?

10 A. That's true. With a cross-sectional relationship like
11 this, we can't rule out confounders. I think this is
12 suggestive of a causal relationship, but it certainly doesn't
13 nail it down.

14 Q. Now, Professor Warshaw, are you aware that the state of
15 California draws its congressional districts using an
16 independent commission? Are you?

17 A. Yes.

18 Q. Okay. Is it your contention that the present California
19 delegation to Congress after the 2018 election is less
20 polarized than the Ohio delegation?

21 A. Well, I think I'm making no claims here about polarization
22 and the difference in polarization across states. I'm simply
23 characterizing different levels of partisan bias across states
24 which is a wholly different quantity.

25 Q. Now, Professor Warshaw, you aren't offering an opinion in

1 this case about voters' opportunity to influence their members
2 of Congress, are you?

3 A. Well, certainly voters whose candidate wins the election
4 are more likely to have their views represented in Congress. I
5 haven't analyzed for purposes of this paper or this report
6 the -- after an election what happens and whether like citizens
7 lobbying or something analyzing -- affects members of Congress.

8 Q. Okay. And you aren't opining in this case that, overall,
9 Democratic voters in Ohio don't regularly vote for candidates
10 who win elections, are you?

11 A. Certainly they do vote for candidates that win elections
12 sometimes. But on the whole, what I'm saying is that in
13 congressional elections, the Democratic voters are much likely
14 to have the candidate they prefer win the election than
15 Republican voters are, which, in turn, means that their views
16 are less likely to be represented in Congress.

17 Q. But whatever happens in a congressional election, you're
18 not asserting any impact on the overall ability of Democratic
19 voters, you know, to regularly -- you know, to vote for
20 candidates of their choice in other elections; correct?

21 A. Certainly they're free to vote however they choose, but I
22 think that if their candidates consistently lose, then their
23 preferences aren't going to be represented in the legislature
24 and in government at-large.

25 Q. But, for example, Democrats in Ohio were more than capable

1 of voting for Senator Sherrod Brown twice during this decade;
2 correct?

3 A. That's correct.

4 MR. LEWIS: Okay. I have nothing further, Your
5 Honors.

6 Thank you very much, Professor Warshaw.

7 MR. STRACH: Very few, Your Honor.

8 I can't represent a number, but I can say very few.

9 CROSS-EXAMINATION

10 BY MR. STRACH:

11 Q. Good afternoon, Professor Warshaw. Phil Strach. Good to
12 see you again.

13 A. Good to see you, sir.

14 Q. Good afternoon. I have just one line of questions that I
15 want to clarify with you.

16 You testified earlier how there's some research suggesting
17 that seniority in Congress is not necessarily a large advantage
18 to a state. Is that a fair characterization?

19 A. I think what the research suggests is that some members of
20 Congress are more effective at procuring funds for their state,
21 and that tends to be a function of who they are rather than
22 their seniority for the most part. I'm not saying it procures
23 no benefits, but I think the bulk of the differences in
24 effectiveness among members are sort of fixed attributes to
25 that member.

1 Q. Okay. Are you aware of the -- do you happen to know about
2 the Wright-Patterson military base here in Ohio?

3 A. No. I apologize, I don't.

4 Q. So you don't -- so you wouldn't know that it's the largest
5 military base in Ohio then; is that correct?

6 A. No. That is correct, I don't know that.

7 Q. Right. You wouldn't know that it's one of the largest
8 military bases in the country, then, would you?

9 A. No, I wouldn't. I don't know that.

10 Q. All right. Well, assuming that to be the case, if
11 incumbency protection was used to ensure that that military
12 base would not be eliminated by the federal government, if
13 incumbency protection was used to do that, is it fair to say
14 that that would be very important to the people of that state?

15 A. It is. But I think it's a factual incorrect foundation for
16 the question. I mean, first of all, military bases are usually
17 eliminated through a commission which operates independently of
18 members of Congress. So individual members of Congress
19 actually have very little control over when a -- particular
20 bases are closed. And to the extent they did affect whether a
21 particular base closed, surely, whoever the member of Congress
22 was from there would share the opinion of trying to keep that
23 base open. But, most importantly, bases are typically closed
24 through a nonpartisan commission rather than through individual
25 members of Congress.

1 Q. So is it your testimony that members of Congress can't
2 influence that process?

3 A. I don't want to say they have no influence, but they have
4 very, very little influence, at least in past -- in the most
5 recent rounds of base closings they're done through commissions
6 rather than through an ordinary legislation.

7 Q. All right. And you've never been a member of Congress;
8 have you?

9 A. No, but I am familiar with the academic literature on this
10 particular question.

11 Q. All right. Have you ever been in a state legislature?

12 A. No.

13 Q. All right. So if a state legislator said it was important
14 to the state to elect congressmen, Republican and Democrats,
15 who could protect the military base, you wouldn't be in a
16 position to dispute that; would you?

17 A. Well, I'd be able to say that that assertion I don't think
18 is supported by the bulk of the literature.

19 MR. STRACH: Thank you, Your Honor. That's all I
20 have.

21 JUDGE BLACK: Very well. Redirect, if any?

22 MS. THOMAS-LUNDBORG: Just very, very brief, just to
23 clear some things up on the record.

24 JUDGE BLACK: Umm-hmm. That's what they all say.

25 As much as you want. Go ahead.

1 MS. THOMAS-LUNDBORG: It will be brief.

2 REDIRECT EXAMINATION

3 BY MS. THOMAS-LUNDBORG:

4 Q. Good afternoon, Dr. Warshaw. I believe you were asked some
5 questions about imputations earlier.

6 Oh, sorry. I think we're waiting to get the display back
7 up.

8 I believe you were asked some questions about imputations
9 during cross-examination and whether you had conducted
10 imputations in your initial report in the remedial map.

11 Do you recall that?

12 A. Yes.

13 Q. Okay. If you could turn to Exhibit 572. What date is this
14 report?

15 A. So this is my rebuttal report dated November 26.

16 Q. And could you turn to page 12 of the report, please. Page
17 12 at the bottom. Thanks.

18 Could you read what you stated in the second paragraph.

19 A. In the second full paragraph I say: In my updated
20 analysis, I used the actual U.S. House elections from contested
21 districts. For precincts in uncontested districts I imputed
22 each party's vote share using the same statistical model that I
23 discuss on the appendix of my initial report.

24 Q. Thank you. And then if you read the sentence starting at
25 the bottom which begins at "For instance," which discusses --

1 actually, if you could just read the paragraph beginning with
2 "Based on these results."

3 A. Right. Based on these results, it is straightforward to
4 calculate the same gerrymandering metrics as in my initial
5 report. For instance, I estimate that congressional elections
6 under the remedial map would have a relatively neutral
7 Efficiency Gap across this period -- 2012-16 elections of -.05.

8 Q. And if you recall, earlier you were asked if you averaged
9 2014. Does it appear that you were including the 2014 number
10 in this average here?

11 A. Yes.

12 Q. If we could go to Exhibit 571, and I'm on the footnote
13 beginning on page six, footnote five.

14 Now, you were asked -- are you there?

15 You were asked in cross-examination a lot of questions
16 about what data that you use and whether you use congressional
17 data. And you mentioned that in a footnote you discuss the use
18 of congressional data versus statewide data. Is this the
19 footnote that you were referring to?

20 A. Yes, that's exactly right.

21 Q. Could you read the sentence that carries over that begins
22 with "In practice."?

23 A. "In practice, though, both legislative races and other
24 statewide races produce similar efficiency gap estimates
25 (verbatim) for modern elections where voters are well sorted by

1 party and ideology. Indeed, the data indicate that the
2 correlation between the efficiency gap estimates based on
3 congressional elections and presidential elections is
4 approximately .8 for elections held after 2000 and .09 for
5 elections held after the 2011 redistricting cycle."

6 MS. THOMAS-LUNDBORG: I have no further questions.

7 JUDGE BLACK: Very well. Thank you, Professor. You
8 may step down.

9 THE WITNESS: Thank you, Your Honor.

10 (Witness excused.)

11 JUDGE BLACK: Is the plaintiff prepared to call
12 another witness?

13 MS. LEE: We are, Your Honor.

14 JUDGE BLACK: Very well.

15 MS. LEE: Plaintiffs call William S. Cooper.

16 JUDGE BLACK: If Mr. Cooper would be willing to
17 approach.

18 MS. LEE: And I believe the deputy has binders for the
19 panel, the clerks and the witness.

20 JUDGE BLACK: You don't want to try and hand it to me?

21 MS. LEE: I think I've learned from others' mistakes.

22 JUDGE BLACK: We're going to get you close to the
23 witness stand. And if you would pause and raise your right
24 hand for the oath to tell the truth. Do you solemnly swear or
25 affirm that the testimony you give today will be the truth

1 subject to the penalty of perjury.

2 THE WITNESS: I do.

3 JUDGE BLACK: Very well. Go ahead and get acclimated.
4 The seat tips back. And we're going to need you near the
5 microphone.

6 THE WITNESS: Feels good.

7 JUDGE BLACK: Good. You got it? We're going to need
8 you closer to that expensive federal microphone.

9 THE WITNESS: Okay.

10 JUDGE BLACK: Very well.

11 MS. LEE: Good afternoon. As I just mentioned, the
12 witness has a binder in front of him as does each of Your
13 Honors. Included are exhibits that have been agreed to by the
14 parties, so I'd like to move them into evidence in order of the
15 tabs in the binder. P90, P454, P91, P92, P93 and P598.

16 JUDGE BLACK: There's no objection from the other side
17 as to admission of these exhibits?

18 MR. McKNIGHT: No, Your Honor.

19 JUDGE BLACK: They're admitted.

20 (Plaintiffs' Exhibits 90, 91, 92, 93, 454 and 598 were
21 admitted.)

22 WILLIAM S. COOPER

23 a witness herein, having been first sworn, testified as follows:

24 DIRECT EXAMINATION
25

1 BY MS. LEE:

2 Q. Would you please state your name for the record.

3 A. My name is Williams S. Cooper.

4 Q. And where do you reside?

5 A. I live in Bristol, Virginia.

6 Q. What is your relationship to this case?

7 A. I have been involved in this case since midsummer of 2018
8 when I was retained by the ACLU to develop some redistricting
9 plans.

10 Q. Okay. Could you please turn to tab 2 of the binder in
11 front of you. For identification purposes, this is P454. It's
12 the longest of these tabs, so if you want to flip through to
13 identify what it is.

14 A. Yes.

15 Q. Do you recognize this document?

16 A. Yes. This contains my initial declaration and exhibits.

17 Q. Tab 2?

18 A. Oh, I'm sorry. Tab -- it includes my exhibits --

19 Q. Okay.

20 A. -- to the initial declaration, which is tab 1.

21 Q. Okay. And if you'd just turn to the second page under the
22 tab, which is Exhibit A. What is presented here?

23 A. This is simply a compilation of my work as it relates to
24 redistricting plans over the years since the late 1980s.

25 Q. And does this exhibit contain a listing of the cases in

1 which you've testified?

2 A. Yes. Again, going all the way back to the late '80s. Most
3 of those were actually in Virginia.

4 Q. Is this document current?

5 A. It is not a hundred percent current. This was produced, as
6 you can see from the heading, in mid-September of 2018. So I
7 think I've submitted a second document that adds a couple of
8 cases where I've testified since then.

9 Q. Okay. What is your current occupation?

10 A. I'm a GIS consultant, a mapping consultant, mainly working
11 with socioeconomic analysis, and even more specifically, with
12 census data as it relates to socioeconomic analysis and
13 redistricting.

14 Q. And how long have you done this mapping-related work?

15 A. Again, since the late 1980s. Really, prior to that time,
16 there was very little mapping work around unless you were
17 working off a main frame at a think tank somewhere where you
18 could actually see a map on screen, probably going back as long
19 ago as the late '70s.

20 Q. In that time, how many redistricting plans have you drawn?

21 A. I've developed thousands of redistricting plans, but a
22 rough estimate is I've drawn probably plans for roughly 750
23 jurisdictions, some of those with only a few hundred people in
24 them, and many of them involved just one plan and nothing went
25 further than that. Others have gone on for years and years.

1 Q. Have you ever drawn statewide plans?

2 A. Many times.

3 Q. Were any of those congressional districting plans?

4 A. I've drawn congressional districting plans in, probably, a
5 half dozen states, maybe more. Several southern states like
6 Georgia, Alabama, Virginia, Louisiana, Florida. I've drawn
7 plans in Maryland, Pennsylvania, Ohio obviously. So I've done
8 a fair number of congressional plans.

9 Q. Other than in this case, have you ever drawn plans related
10 to a partisan gerrymander?

11 A. I have made a brief appearance in the *Benisek* case in
12 Maryland, just a short-term project to demonstrate that the
13 defendants could have drawn another plan that would have been
14 even worse from a partisan standpoint, but at the same time, at
15 least looked a little better to the naked eye. I was working
16 on behalf of the defendants, but I was not very involved in
17 that case.

18 Q. And do you recall the case *Smith v. Clark* in Mississippi?

19 A. That was in the early part of the 2000s where I worked on
20 a -- a plan that would have led to a less partisan
21 congressional plan in the state of Mississippi. The state of
22 Mississippi lost a congressional seat in the 2000s after the
23 2000 census was released, which meant that the delegation lost
24 a Democratic seat in north Mississippi. And so I testified at
25 a trial showing that one could have probably produced a plan

1 that would have at least given Democrats a fair fight in the
2 north Mississippi District. That was argued to the Supreme
3 Court and lost by the Democrats, so the net effect is there are
4 four districts in Mississippi now and three are Republican.

5 Q. And have you done any other plans, not necessarily expert
6 work in a case, but just drawn other plans related to a
7 partisan redistricting?

8 A. Yes. Recently I worked for Governor Wolf in Pennsylvania
9 last January and February over about a four- or five-week
10 period to produce a plan for his office that was later
11 submitted to the court along with several other proposals from
12 different parties in late February of 2018, and the court,
13 within one day, just selected a special master's plan.

14 Q. Sure. And we've already touched on that you have testified
15 as an expert before, and the cases that are listed here in
16 Exhibit A.

17 Generally, in cases where you've testified as an expert,
18 have you drawn districting plans in those cases?

19 A. I think in almost every instance, except for a case in --
20 well, there's a case in 1990 in Virginia, *Moon v. Beyer*, which
21 related to school district elections. But now that I think
22 about it, I didn't actually testify; I simply submitted the
23 declaration.

24 Q. In your work in redistricting and demography do you analyze
25 census data as a regular part of your job?

1 A. Yes, both in drawing the redistricting plans, and also I
2 frequently testify in redistricting cases that involve Section
3 2 of the Voting Rights Act. So -- I will also testify on
4 Senate Factor 5 relating to socioeconomic disparities between
5 races.

6 Q. And do you generally submit declarations in the cases in
7 which you testify?

8 A. Almost always.

9 Q. Well, in your declarations do you generally author either
10 illustrative or remedial districting plans?

11 A. Yes.

12 Q. Have Courts implemented any of the remedial plans you have
13 drawn?

14 A. Yes, in several instances.

15 Q. Is it ever the case that the remedial plan implemented is
16 the same as the illustrative plan you author at the beginning
17 of the case?

18 A. That does happen. In fact, it happened as recently as last
19 week. A federal court in Mississippi has ordered what was an
20 illustrative plan as a court-ordered plan in a state Senate
21 district in Mississippi. It was a Section 2 lawsuit, *Thomas v.*
22 *Bryant*.

23 Q. When you have testified as an expert in the past, have you
24 been accepted by the court as an expert?

25 A. Yes, in all circumstances.

1 Q. Well, have there ever been a time the court did not qualify
2 you as an expert?

3 A. No.

4 MS. LEE: Your Honors, we move to qualify Mr. Cooper
5 as an expert in the fields of redistricting, map drawing and
6 demography.

7 JUDGE BLACK: Defense wish to be heard?

8 MR. McKNIGHT: No objection to the qualification in
9 those fields.

10 JUDGE BLACK: The intervenors?

11 MR. TUCKER: No objection, Your Honor.

12 JUDGE BLACK: The Court deems the gentleman an expert.
13 Congratulations.

14 THE WITNESS: Thank you.

15 (Laughter.)

16 THE WITNESS: Not worthy.

17 Q. Mr. Cooper, what were you asked to do in this case?

18 A. I was asked to prepare a plan that undid what the lawyers
19 had considered to be a partisan gerrymander. And so I
20 proceeded from that standpoint with my census data and mapping
21 software to reexamine the plan that was adopted in 2012 and
22 apply traditional redistricting principles to result in a map
23 that was a little more fair for Democratic voters and at the
24 same time visually more appealing.

25 Q. And what did you take undoing the partisan gerrymander to

mean?

A. I took it to mean that I knew at the present time with the 2012 election plan that the split in the delegation in Ohio was 12-4, and I was also aware that there were many Democratic voters in certain parts of the state, namely in the Cincinnati area; Hamilton County; northeast Ohio, particularly in Cuyahoga County, Summit County; as well as a stronghold of Democratic voters in Franklin County, in Columbus. So I initially started looking at those areas to see if maybe, with more regularly-shaped districts, one could create a plan that led to a more balanced partisan result.

Q. Were you asked to do anything else in this case in addition to drawing a proposed plan?

A. I was asked to develop a database of election data from the precinct level for the 2012 and 2014 and 2016, 2018 elections.

Q. Were you asked to respond to the reports of any of the experts from the other side?

A. Only to the report of Dr. Hood.

Q. And so you had just mentioned data compilation. If you'd just flip to Exhibit B under tab 2 in the binder in front of you.

A. Yes.

Q. Does that exhibit describe your data compilation work?

A. Yes, it does.

Q. Okay. We'll return to the work you did responding to the

1 defendants' experts, but first I would just like to discuss
2 your work in creating a districting plan. In general, not just
3 specific to this case, how do you go about drawing a
4 districting plan?

5 A. Well, the first task is to obtain the census data and
6 geographic data that would allow you to pull up a plan on
7 screen. So I obtained -- or, actually, I already had what is
8 known as the PL 94-171 file, which is the first file released
9 by the census for purposes of redistricting.

10 Every decennial census comes out in the early spring of
11 each year ending in one. Like 2021 will be the next year. And
12 using that file, I merged that with electronic files called
13 shapefiles that the Census Bureau releases with information
14 that goes from the county level and state level all the way
15 down to a census block, which is the equivalent, in a city, of
16 nothing more than maybe a city block, and in rural areas a
17 block can be much larger geographically because it's more
18 sparsely populated.

19 And you can layer on top of that information about census
20 tracks or subunits of census tracks called block groups, which
21 are aggregations of census blocks. Then, of course, you can
22 also show on-screen boundaries for municipalities and for
23 school districts and for political subdivisions like townships
24 as we have in Ohio. So I had many different layers of
25 geography to look at using my GIS software as I was preparing

1 mine.

2 Q. What type of software do you use in constructing
3 redistricting plans?

4 A. The software package I use is called Maptitude for
5 Redistricting. It's probably the most widely used software for
6 redistricting purposes, but there are other software packages
7 out there that can also be relied upon. But I'm pretty much
8 exclusively working with Maptitude.

9 Q. And when you're working in Maptitude, what do you view on
10 the screen?

11 A. I view a map that would show the whole state at any one
12 point in time, but I can zoom all the way down to street level
13 and actually look at this block and determine whether there's
14 anyone living here overnight, you know, as part of the census
15 enumeration. So I can see just about anywhere in the state
16 almost instantaneously just by zooming in.

17 Q. Did you submit a declaration in this case?

18 A. I submitted a declaration. I believe it was dated -- my
19 first declaration was October 5th, I think, of 2018.

20 Q. Could you please turn to tab 1 of the binder in front of
21 you. And for identification this is P90. Do you recognize
22 this document?

23 A. Yes. This was the initial declaration.

24 Q. What does this declaration lay out?

25 A. Well, for starters, I provided a little bit of demographic

1 background for the state as a whole breaking out how population
2 has changed between 2000 and the census of 2010 as well as
3 updated census estimates through 2017, at the statewide level,
4 showing not just total population, but also a breakout of
5 population by race and ethnicity.

6 And I looked at other -- other smaller units of geography,
7 like metropolitan statistical areas which are combinations of
8 counties around the state, as well as the region of the state
9 which is predominantly Appalachian. And so in Figure 2 you see
10 population for those regional areas and population change over
11 time. And I think I have -- I have a table in here that shows
12 population by county for 2000, 2010 or 2017.

13 The Census Bureau provides estimates on an annual basis for
14 counties and the state but nothing under the county level. So
15 the 2017 estimates came out in the spring of 2017 at the county
16 level, so there will be updated stats sometime later this
17 spring for 2018.

18 Q. Does this declaration lay out background on the 2002 and
19 the 2012 plans?

20 A. Yes. In the third section I begin to provide a bit of
21 information on the 2002 plan and then move along to examine
22 what the 2012 plan looks like in terms of the districts as well
23 as the number of counties that are split by the 2012 plan. You
24 can see that information is starting in subsection (b)
25 paragraphs 24 to 29.

1 Q. And then the declaration continues to lay out the proposed
2 remedial plan?

3 A. Yes.

4 Q. Did you review the 2012 plan in your work?

5 A. I did. I spent quite a while looking at it and analyzing
6 it from various angles. If one wants to really spend a lot of
7 time looking at it with great detail, you can click on a Google
8 map and actually see the whole thing all the way down to street
9 level.

10 Q. And the Google map you're referencing is the address listed
11 in paragraph 29?

12 A. Right.

13 Q. Okay.

14 MS. LEE: Could you please put up P90 at page 12,
15 Figure 5.

16 Q. And what's depicted here?

17 A. That is the 2012 plan.

18 Q. And when you reviewed the 2012 plan, did you identify
19 anything notable about it?

20 A. Well, I noticed that there were a number of counties that
21 were split multiple ways. Cuyahoga is split four ways, Summit
22 County is split four ways, Portage is split three ways, I
23 believe Stark is split three ways, Hamilton is split only two
24 ways but in sort of a -- in an irregular fashion. So that
25 jumped out at me. As well as the elongated District 9 known as

1 Snake on the Lake. It runs from Toledo into -- into Cleveland.
2 And I also examined Franklin County, which has three districts
3 under the 2012 plan and is very irregular in shape.

4 Q. And referring back to your testimony earlier about how you
5 generally go about constructing a redistricting plan, how did
6 you go about constructing the proposed remedial plan that you
7 offer in this case?

8 A. Well, I started by seeing if there would not be ways to
9 reconfigure these population centers so that the District lines
10 were not so odd and extraordinarily unusual in shape.

11 So I was applying what are known as traditional
12 redistricting principles, but at the same time I was also aware
13 of Ballot Initiative 1 that had just been adopted statewide as
14 a result of the referendum. And so I knew that according to
15 the ballot initiative, any plan drawn in the future, at least
16 after the 2020 census at a minimum, would have to keep the city
17 of Cincinnati in a single district and the city of Cleveland in
18 a single district. So I wanted to also follow the ballot
19 initiative as well as just apply traditional redistricting
20 principles in any plan that I produced for you guys.

21 Q. In addition to keeping those -- Cincinnati and Cleveland
22 whole, do the requirements of the -- of Ballot Issue 1 mirror
23 what you consider to be traditional redistricting principles?

24 A. Yes, by and large.

25 MS. LEE: I'd like to please put up P90 at page three.

1 If you're on paper, it's page three as well, paragraphs 5 and
2 6.

3 A. Yes.

4 Q. Are these the criteria that you used in drawing your
5 proposed remedial plan?

6 A. Yes. Traditional redistrict criteria, which would include
7 districts of equal population. Actually it has to be zero
8 deviation from the ideal district size for a congressional
9 plan. The districts have to be contiguous, compact and need to
10 comply with the Voting Rights Act.

11 Q. So you had just touched on equipopulation and contiguity.
12 Are those, would you say, the easiest to view, in sort of a yes
13 or no way, a plan complies with them?

14 A. Yes. Because you can get an instant readout from the
15 mapping software to know exactly what the underlying population
16 is, whether it's over a hundred people or under a hundred
17 people, whatever. And there is a menu item in Maptitude for
18 Redistricting which will automatically check for contiguity.
19 So those two are easily dealt with in a yes/no fashion.

20 Q. How do you assess compactness in a plan?

21 A. One way is to do the eyeball test and just take a look at
22 it and see if it makes sense visually. And that was my initial
23 concern with the 2012 plan, because it makes no sense visually.
24 But there are compactness tests which one can run using
25 Maptitude, so I employed two of the measures, the Reock Test

1 and the Polsby-Popper Test as I was developing and comparing
2 and contrasting plans.

3 Q. If a district is larger in area, does that necessarily mean
4 it will be less compact?

5 A. No.

6 Q. And why not?

7 A. Well, you can have a district that's very small, an area
8 that's a city council district or state legislative district
9 which could be not at all compact and score very low on the
10 Reock or Polsby-Popper scores but maybe cover a very small area
11 just because it's densely populated.

12 Q. How do you define or assess communities of interest?

13 A. Well, it's something of a vague term and defined many
14 different ways, but I think it's fair to say a community of
15 interest would represent a -- an area or a region where there
16 are certain cultural or socioeconomic ties, historical ties.
17 And it can also be applied to minority populations as well,
18 taking into account the Voting Rights Act, where there's often
19 a community of interest as it relates to Latinos or
20 African-Americans in a Section 2 case, and in this case, too,
21 for that matter.

22 Q. Do you ever use counties or municipal political
23 subdivisions as a more objective way to identify communities of
24 interest?

25 A. Yes. That's a more objective way. It's not foolproof, but

1 if you can show that you've attempted to keep counties and
2 cities together with a minimal number of splits or divisions,
3 that's an indication that you've preserved communities of
4 interest.

5 Q. Could an area along a waterfront be considered a community
6 of interest?

7 A. Could be.

8 Q. Did you observe any such communities of interest in Ohio?

9 A. Well, I think there was probably a community of interest
10 along the Ohio River and there is, obviously, Lake Erie, so
11 that is a kind of a community of interest.

12 I would question whether putting Toledo and Cleveland in
13 the same district along a 115-mile strip of land is necessarily
14 abiding by the real meaning behind the term community of
15 interest. Because to do that -- even though all that area
16 along Congressional District 9, in fact, is pretty much on Lake
17 Erie -- to do that you've got to split about five counties,
18 which in and of themselves are communities of interest. So I
19 don't really think you can draw Congressional District 9 and
20 argue that by so doing, connecting Cleveland with Toledo, you
21 are preserving communities of interest.

22 Q. How do you assess splits of counties and municipal sub --
23 excuse me, municipal civil divisions?

24 A. How do you assess splits?

25 Q. Yes.

1 A. There is also a menu item in Maptitude that will give you
2 an instant readout of the number of counties and what are
3 called MCDs, metropolitan civil divisions or also known as
4 townships in Ohio, so I can see as I'm drawing a plan exactly
5 how many I split. Of course, as you're just working on a city
6 or a county, as part of the larger plan you can just visually
7 tell whether or not you're splitting. But as a final check,
8 you can always run the menu item on Maptitude and it tells you
9 exactly how many counties and political subdivisions have been
10 split with population breakouts.

11 Q. In drawing the proposed remedial plan did you split any
12 counties or other political subdivisions if you could avoid it?

13 A. No, I did not. There, of course, are many different ways
14 one can draw a plan, so it's sort of difficult to say if you've
15 hit the optimum. In the proposed remedial plan, that plan
16 splits 14 counties and 27 political subdivisions or townships.

17 So there may be another way to draw a plan that would have
18 even fewer splits, but I did not arrive at that solution. And
19 part of the problem is because, in addition to traditional
20 redistricting principles, one also has to attempt to take into
21 account the incumbents and their residences, because incumbents
22 can live just about anywhere. If you try to avoid pairing
23 incumbents, sometimes you're forced to split political
24 subdivisions or counties. So that's a factor that's always
25 lurking in the background.

1 Q. If there are fewer districts to be drawn in a congressional
2 Plan, should that lead to fewer county splits?

3 A. Generally speaking, yes. For example, in the 2002 plan
4 there were 18 congressional districts, dropped down to 16, so
5 one would expect that you could reduce the number of county
6 splits by one or two under normal circumstances just because
7 you're working with fewer districts.

8 Q. Did you look at election results in drawing the proposed
9 remedial plan?

10 A. I had compiled information for the 2012 and 2016 elections
11 right at the outset as I was developing the proposed remedial
12 plan, and I also had available at my disposal the same data set
13 that the state legislature had. It's referred to in my report
14 as the Ohio Common and Unified Redistricting Database. And
15 that was prepared by a professor from Cleveland State as well
16 as another professor, I think, from Ohio University and some
17 graduate students over about a two-year period. And it breaks
18 out election results by precinct for the 2008 and 2010
19 elections, and perhaps even prior to that, but I think only for
20 2008 and 2010, and also included information about statehouse
21 and state Senate districts that were in place at the time of
22 the release of the 2010 Census. So I relied on that as well,
23 and there was just an enormous amount of political data in that
24 data set, including presidential contests and state legislative
25 contests.

1 Q. Were you reviewing the whole set of election results when
2 you were drawing the plan?

3 A. No. I mainly focused only on House results. But I did
4 have that information available, so I occasionally glanced at
5 it. But I was not constantly monitoring every little -- every
6 little change in the percentage of the Democratic presidential
7 voting, 2008, as I was drawing the plan, for example.

8 Q. And you referred to constantly looking at -- you weren't
9 constantly looking at the other results. But for House results
10 were you constantly looking at them while you were drawing the
11 plan?

12 A. No.

13 Q. Were you here earlier for Dr. Warshaw's testimony today?

14 A. I was here for his testimony today but not yesterday.

15 Q. Do you recall that he was asked about the calculation he
16 did of the partisan metrics related to the remedial plan?

17 A. Yes.

18 Q. Is this the first time that you are learning of what the
19 partisan metrics for the proposed remedial plan were?

20 A. Yes. I have not met Dr. Warshaw, nor had I seen his expert
21 report or follow-up supplemental report even to this day.

22 Just -- all I know is what I've seen here today at trial.

23 Q. Okay. Once you've drawn the proposed remedial plan, did
24 you compare features of the 2012 plan with the proposed
25 remedial plan?

1 A. Yes.

2 Q. So you had earlier mentioned that in assessing compactness
3 one of the things you do is a visual review of the districts,
4 so I'd like to show you about five of the districts under the
5 current 2012 plan and the proposed remedial plan that you
6 submitted in this case.

7 MS. LEE: Could we please put up P454 at pages 28 and
8 49. We are in tab 2 of the binder, but since we're popping
9 between two pages, electronically may be easier for folks.

10 Q. Do you have that on your screen? Do you see it?

11 A. Yes, I do.

12 Q. Okay. What is depicted here?

13 A. Well, on the left side you see the current U.S. House
14 District 1 which includes part of Cincinnati, part of Hamilton
15 County, and then goes into Warren County at the northeast
16 corner to pick up all of Warren County. So it's in two
17 counties of Warren and Hamilton.

18 And on the right-hand side you see the proposed remedial
19 plan, District 1, which is entirely in Hamilton County and
20 includes all of Cincinnati. A small part of Hamilton County is
21 in District 2 because Hamilton County has a population of, I
22 think, somewhere around 825,000 or so. So part of Hamilton
23 County would have to be put into District 2 and in a
24 16-district plan.

25 Q. In your view, do you consider District 1 in the proposed

1 remedial plan to be more regularly shaped than that in the 2012
2 plan?

3 A. Yes. That's an easy one.

4 Q. I would like to ask you also to compare District 3 under
5 each of the plans, which is in Franklin County.

6 MS. LEE: If we could please put up P454, pages 30 and
7 51.

8 Q. And, Mr. Cooper, what is depicted here?

9 A. Again, on the left-hand side is Franklin County and
10 District 3. Under the 2012 plan and on the right-hand plan --
11 on the right-hand side is the proposed remedial plan showing
12 District 3 highlights, the yellow in both instances, with the
13 other districts surrounding it in gray shade.

14 Q. Do you find anything notable about the difference between
15 these two districts?

16 A. Well, yes. One is easy to figure out where the district is
17 and, obviously, much more regularly shaped. Present day
18 District 3 is a mess, really.

19 MS. LEE: Okay. Continuing on in this same exhibit,
20 could we please put up pages 36 and 57.

21 Q. What is depicted here?

22 A. On the left-hand side you see District 9 -- the so-called
23 Snake on the Lake -- running from Toledo all the way into
24 Cleveland and Cuyahoga County, crossing Sandusky, Erie, Lorain.
25 So you can see it's a long snake-like district.

1 And on the right-hand side you see the proposed remedial
2 plan, District 9, which encompasses only Lorain County and part
3 of Cuyahoga. Cuyahoga has to be split because it's well over a
4 million people, so there are going to be more than two
5 districts in Cuyahoga for sure.

6 MS. LEE: And continuing on in this same exhibit,
7 could we please put up pages 38 and 59.

8 Q. Mr. Cooper, what is depicted here?

9 A. This is District 11. And, again, on the left-hand side you
10 see District 11 is drawn in the 2012 plan, which includes part
11 of Cuyahoga and then goes down into Summit County in a very
12 weird fashion, splitting Akron in bizarre ways. And you
13 compare that with the proposed remedial plan, District 11,
14 which is entirely in Cuyahoga County and much more reasonably
15 shaped.

16 Q. And does the proposed remedial District 11 contain the
17 entire city of Cleveland?

18 A. Yes. Again, I'm following Ballot Initiative 1 which would
19 require that all of Cleveland be in a single district.

20 Q. And I won't make us go through the entire map, but I would
21 like to look at just one more, please.

22 MS. LEE: Please put up pages 40 and 61 in this same
23 Exhibit P454.

24 Q. Mr. Cooper, can you identify what's depicted here?

25 A. Yes. On the left-hand side we're looking at District 13,

1 which is part of Trumbull, Mahoning and into Portage County and
2 then into the weird boundaries within Summit County, which is
3 actually split among four districts. We're just looking at two
4 of them so far.

5 And on the right-hand side you'll see District 13 under the
6 proposed remedial plan, which includes a little bit of Mahoning
7 and then all of Trumbull, Ashtabula, and Lake Counties.

8 JUDGE BLACK: Can you stay close to the microphone.
9 Judge Watson would appreciate it.

10 (Laughter.)

11 MS. LEE: Thank you.

12 Q. We had touched on compactness before. Mr. Cooper, did you
13 compare the 2012 plan and the proposed remedial plan on
14 compactness scores?

15 A. Yes, using the objective compactness scores, Reock and
16 Polsby-Popper.

17 Q. Okay. And in tab 2 at Exhibit H --

18 MS. LEE: And we can just put it up on the screen,
19 P454 at page 73.

20 Q. Is that -- is this that comparison of compactness scores?

21 A. This is the comparison between the proposed remedial plan
22 and the 2012 plan. And you can see that the proposed remedial
23 plan scores significantly higher on Polsby-Popper in terms of
24 minimums and maximums as well as the overall mean. The bottom
25 line figure, the mean, shows that Polsby-Popper has a .35 score

1 under the proposed remedial plan versus .19 under the 2012
2 plan. And the differences are not quite as large using the
3 Reock score where one sees a .41 mean average versus .35 in the
4 2012 plan.

5 And as I explain in my report at some point, there are
6 issues relating to the Polsby-Popper score and the Reock score
7 for Congressional District 9 because of the way the Census
8 Bureau has extended water blocks that are part of these
9 counties along Lake Erie, out into the middle of Lake Erie.
10 And if you remove those water blocks, then District 9 scores
11 very low. So it is very misleading to look at this chart and
12 just look at the objective scores without that -- taking that
13 into account.

14 Q. Is there a hard cutoff measure under either of these
15 metrics for compactness?

16 A. Not -- not really, because you can have districts that are
17 reasonably shaped and follow jurisdictional boundaries perhaps
18 that would score low but would not be unreasonable.

19 Q. For both of these measurements, does the measure always
20 land between zero and one?

21 A. It always lands between zero and one. This Polsby-Popper
22 score is a perimeter score over area of a district. The
23 formula's in my report. But it's just a way to take into
24 account the perimeter and the area it covers, and if you have a
25 low score, in other words, something close to zero, that's an

1 indication that it's not a very compact district, generally
2 speaking.

3 The Reock score is a little easier to understand because
4 it's just simply a ratio of an area for a circle drawn around
5 the district. And, again, districts that start getting below
6 .20 are somewhat problematic, generally speaking, in my
7 opinion. But not always. There are exceptions.

8 Q. Did you compare the 2012 plan and the proposed remedial
9 plan as far as county and municipality splits?

10 A. Yes.

11 Q. Okay.

12 MS. LEE: And if we'll please put up P454 at page 66.

13 Q. What is indicated here?

14 A. This just breaks out the counties that are split between
15 one or more districts or .2 or more districts under the
16 proposed plan and the 2012 plan.

17 Q. And for reference, this is Exhibit F from the appendix to
18 your original declaration.

19 If we turn to the next page in this exhibit, what is
20 indicated here?

21 A. This also shows the metropolitan civil divisions or
22 townships that are split between districts under the 2012 --
23 under the proposed plan on the left-hand columns and the 2012
24 plan in the right-hand columns. As I think I've mentioned, the
25 proposed plan splits 27 political subdivisions statewide

1 compared to 73 in the 2012 plan or 55 of those which have
2 populations involved. Because there are some political
3 divisions that are split in the 2012 plan that involve
4 unpopulated areas, so if you don't count those, you're left
5 with 55 splits. So about twice as many political subdivision
6 splits in the 2012 plan versus the proposed plan.

7 Q. Okay.

8 MS. LEE: And could we just turn to the next two pages
9 in this exhibit.

10 Q. This just continues the rest of the listing of the MCDs
11 split under the 2012 plan; is that correct?

12 A. That's correct. So the left-hand column has nothing there
13 because there were only 20.7 splits.

14 Q. Did you review the 2012 plan and the proposed remedial plan
15 regarding the non-dilution of minority voting strength?

16 A. I did. The proposed plan maintains a minority opportunity
17 district in Cuyahoga County with an overall black voting age
18 population of about 47 percent, which, as I understand it, is a
19 percentage that would -- would normally allow African-Americans
20 and other minorities in that district to elect a candidate of
21 choice based on the analysis that Dr. Handley conducted. She
22 testified yesterday. I was not here. But my understanding is
23 a 45 percent district, in her view, would be adequate. So
24 given that, I made the decision just to keep District 11
25 entirely in Cuyahoga County.

1 Q. Why did you create a district that had a slightly higher
2 black voting age population than the 45 percent identified by
3 Dr. Handley?

4 A. It just happened. I put all of the city of Cleveland in
5 District 11 along with, I think, maybe a couple of suburbs, so
6 the end result was I had a 47 percent district. I was not
7 trying to max it out in any way.

8 Q. If you could please turn to Exhibit D2 under tab 2 in the
9 binder in front of you.

10 MS. LEE: If we could put up P454 at page 26.

11 Q. And is this the Population Summary Report for 2012, the
12 current Ohio congressional plan?

13 A. Yes.

14 Q. And what is the black voting age population in District 1?

15 A. In District 1 in Hamilton County and part of Cincinnati and
16 Warren County, the black voting age population, which is
17 indicated in the third from the right column, percent 18+. And
18 the AP stands for any part black, so it includes a small
19 percentage of African-Americans who are of more than one race.
20 And the percentage would be 21.3 percent.

21 MS. LEE: Okay. And could we please put up P454 at
22 page 47, which is Exhibit E2 under tab 2 in the binder in front
23 of you.

24 Q. Is this the Population Summary Report for the proposed
25 remedial plan?

1 A. Yes, it is.

2 Q. And is the black voting age population in District 1 higher
3 under this plan?

4 A. Yes, it's about five percentage points higher. It's 26.74
5 percent. And, again, this just happened because I left
6 Cincinnati in a single district rather than splitting it into
7 part of District 2 as well as District 1.

8 Q. And did you consider the non-dilution of minority voting
9 strength in any districts in addition to Districts 1 and
10 Districts 11, which we've already discussed?

11 A. I was also mindful of the significant black population,
12 minority population in District 3, which is in Franklin County,
13 so I did take that into consideration as well. The percentage
14 in the proposed remedial plan for District 3 is 30.31 percent,
15 which is about the same as it is in the 2012 plan, maybe a half
16 point less.

17 Q. Okay. Did you compare congressional election results under
18 the 2012 plan and the proposed remedial plan?

19 A. Yes.

20 Q. Okay. If you could flip back to your declaration at tab
21 one in the binder in front of you and please turn to page 20.

22 MS. LEE: If we could please put up P90 at page 20,
23 Figure 8.

24 A. Yes, I have it.

25 Q. Sure. Thanks. What is depicted here in Figure 8?

1 A. This just compares the percentage Democratic vote by
2 congressional district for the proposed plan versus the 2012
3 plan across three post-2010 election years: 2012, 2014 and
4 2016.

5 Q. How did you compute the percentages shown in this figure?

6 A. I took precinct level data, disaggregated it to the census
7 block level based on the voting age population in the precinct
8 versus the census block and then reaggregated it back up to the
9 congressional district level.

10 Q. Are these predictions of what the outcome would be in these
11 districts?

12 A. No. They simply are historical in nature and would reflect
13 nothing more than the vote for each one of those three election
14 years.

15 Q. This is the aggregation of actual vote percentages in the
16 underlying VTDs; is that right?

17 A. That's correct. And it's only head-to-head contests. So
18 if there was a third party -- head-to-head Democrat versus
19 Republican. So if there was a third-party candidate, that vote
20 share is not counted, so these would add up to a hundred
21 percent Democrat plus Republican.

22 Q. And continuing on on page 20, looking at paragraph 51, were
23 there any uncontested congressional elections in those years?

24 A. Yes. In 2012, District 8 was uncontested. That was
25 Representative Boehner's district. And also there was no

1 Republican candidate in District 11.

2 Q. And in 2014, was there an uncontested election?

3 A. There was no candidate for the Democrats in Congressional
4 District 7.

5 Q. Well, did you impute election results for those uncontested
6 races?

7 A. No. I'm not a political scientist so I did not attempt to
8 produce my own imputed results. I was aware that Dr. Warshaw
9 was going to go ahead and do that in his analysis.

10 Q. Why did you use percentages here in Figure 8 instead of
11 just vote totals?

12 A. It's just an easier way to review the data rather than
13 having what would amount to 16 columns with vote totals.

14 Q. Can you determine if a district is packed or cracked just
15 by seeing the percentage of the vote alone?

16 A. No, you cannot.

17 Q. And why not?

18 A. Because you have to take into account regional differences
19 in the spatial pattern of partisan voting, Democratic parts of
20 the state, Republican parts of the state. And also even in the
21 urban areas one would have to take a look at the underlying
22 population, not just partisan, but also racial. And taking
23 into account all those factors, then you could maybe arrive at
24 a conclusion as to whether a district is cracked or packed
25 along partisan or racial lines.

1 Q. So if you put a city that had been split back together in a
2 single congressional district, would that be likely to drop the
3 Democratic percentage in the district that it previously had
4 been split into?

5 A. It could, but the reverse could -- well, in the -- in the
6 case of Congressional District 1 where I made Cincinnati whole
7 again, the impact was to significantly enhance Democratic
8 voting strength in Congressional District 1. But the reverse
9 effect would mean that in some of the rural counties that would
10 be in proposed plan District 2 along the Ohio River would have
11 a higher Republican percentage, obviously. But that area is
12 overwhelmingly Republican anyway. So I don't think that just
13 because Congressional District 2, under the proposed remedial
14 plan, has a higher Republican share that I'm in some fashion
15 packing Republicans into District 2, or, put differently, that
16 I'm packing Democrats into District 1 because it's got a higher
17 Democratic share by virtue of keeping Cincinnati whole.

18 Q. Do you think that a plaintiff who goes from a district with
19 a very high Democratic percentage is necessarily worse off in a
20 district with a lower Democratic percentage?

21 A. No, I don't think one could say that.

22 JUDGE BLACK: How are you coming?

23 MS. LEE: More than half.

24 JUDGE BLACK: Think it's time for a break?

25 MS. LEE: Okay.

1 JUDGE BLACK: We're at almost 3:05. We're going to
2 break for 15 minutes to 3:20. During the break, sir, please,
3 do not discuss your testimony. Okay?

4 THE WITNESS: Okay.

5 JUDGE BLACK: Very well. We'll break until 3:20.

6 COURTROOM DEPUTY: All rise. This court is in recess
7 until 3:20.

8 (Witness temporarily excused.)

9 (Recess taken: 3:04 PM - 3:22 PM.)

10 (William S. Cooper resumes the witness stand.)

11 JUDGE BLACK: You may all be seated. Thank you. The
12 witness may re-take the witness stand. And the witness
13 understands that he's still under oath. Correct?

14 THE WITNESS: I do.

15 JUDGE BLACK: Very well. And you told me, what,
16 you're 90 percent through? Is that what I heard?

17 MS. LEE: Let's say 65.

18 JUDGE BLACK: Take the time you need.

19 JUDGE WATSON: Within in next five minutes.

20 Q. Referring back to your original declaration that we've just
21 been discussing at tab 1, have you discovered any errors in
22 your declaration since you finished it and it was produced?

23 A. I discovered a typo on page 11, paragraph 26 of my
24 declaration.

25 Q. And what is that?

1 A. The paragraph reads, "The counties of Cuyahoga and Summit
2 are each split into four districts." And the final sentence
3 says, "Franklin, Lorain, Mercer, Portage, and Summit," again,
4 "are split into three districts." And that should be "Stark"
5 instead of "Summit."

6 Q. Did the error in that paragraph at all impact your opinion
7 in this case?

8 A. No, not at all.

9 Q. Did you find any other errors in your original declaration?

10 A. Well, I now have some question in my mind as to whether
11 there are 22 counties that are split in the 2002 plan or if, in
12 fact, it is 21. According to every piece of information I
13 found on the Census Bureau's Web site which identifies all
14 census blocks in the state as well as which congressional
15 district they are associated with, there are 22 counties that
16 are split. But if you look at the data, the Census Bureau
17 indicates that there is just one block of District 12 in Knox
18 County which has seven people in it. And if you go back and
19 look at the legislation that enacted the 2002 plan, it
20 indicates that Knox County is entirely in District 18 with no
21 part in District 12. So I believe it's a Census Bureau error,
22 but have not been able to identify with certainty that it is,
23 because even the Census Bureau's errata page on the Web site
24 does not identify that particular error as one of several
25 errors in Ohio. So it's either 22 or 21.

1 Q. And would -- if it's an error, would the error of thinking
2 22 counties are split in the 2002 plan versus 21 counties
3 impact your opinions at all?

4 A. Well, only to the extent that it would suggest that it
5 would have been even easier to get below 20 split counties in
6 the 2012 plan with some reduction of the districts in the
7 congressional plan from 18 to 16. So right off the bat it
8 should have been possible to aim for 19 splits at a minimum.
9 And as we've shown with the proposed remedial plan, obviously
10 you can go much lower than that.

11 Q. And did you identify any other errors in the original
12 declaration?

13 A. Not in the text. I am aware of a mistake that surfaced
14 sometime in late November when we discovered we had an
15 incorrect address for Representative Jordan. Is that what
16 you're referring to?

17 Q. Yes.

18 A. Okay.

19 Q. And where did you get Congressman Jordan's address
20 initially?

21 A. I got it from the plaintiffs' attorneys.

22 Q. Yes. And I continue to apologize.

23 Did this incorrect address impact your work at all?

24 A. No. We had incorrectly identified Congressman Jordan as
25 living in Lima, and he actually lives in Urbana in Champaign

1 County. So we have done a follow-up plan that changes
2 Districts 4 and 8 slightly to make sure that no incumbents are
3 paired in the proposed remedial plan.

4 Q. Okay. So if you'll please turn with me to tab 3 in the
5 binder in front of you. And for identification this is P91.

6 What is this document?

7 A. This document simply points out that error that I just
8 noted, correcting District 4 and 8, so that Congressman Jordan
9 is in District 4 and Congressman Davidson is in District 8 and
10 would not be paired with Congressman Jordan.

11 Q. And are there any other changes to the proposed remedial
12 plan besides that that you've just identified between Districts
13 4 and 8?

14 A. No. Other than changing a couple counties in that portion
15 of the plan, there are no other changes to any of the other
16 districts. It has no impact whatsoever on anything I said
17 prior to this November 30th declaration.

18 Q. Okay.

19 MS. LEE: And so if we could please put up P91, page
20 three, paragraph 5.

21 Q. And so the number of county and MCD splits remains; is that
22 correct?

23 A. Correct.

24 Q. And do the compactness scores remain the same?

25 A. They remain the same.

1 Q. Did the changes you made in the proposed remedial plan,
2 corrected, at all impact the non-dilution of minority voting
3 strengths that you considered in your original plan?

4 A. No. There's no real impact on minority voting strengths.
5 Those are predominantly white districts to begin with, so that
6 had no effect.

7 Q. Does the proposed remedial plan, corrected, still comply
8 with Issue 1?

9 A. Yes.

10 Q. Okay.

11 MS. LEE: And if you'll put up P91 at paragraph 9.

12 Q. Are there any changes to the congressional vote
13 percentages?

14 A. Very minor changes in a range of plus or minus 0.3 to 0.4
15 and those new numbers are reflected in Exhibit S.

16 Q. And that's under this same tab as part of this exhibit; is
17 that correct?

18 A. Yes.

19 Q. Why did you make this correction to the proposed remedial
20 plan?

21 A. Well, first, because it was obviously in error, but
22 foremost, because we did not want to pair Congressman Davidson
23 and Congressman Jordan in District 8, and that corrected that
24 issue.

25 Q. Okay.

1 A. Because the other plan actually had Champaign County
2 entirely in District 8.

3 Q. And so was this correction made in order to meet the
4 criteria you originally intended and described in your original
5 declaration?

6 A. Correct. My intention in the original declaration was to
7 avoid pairing all incumbents except for District 1 in
8 Cincinnati where two incumbents are actually placed in District
9 1 because two incumbents live in Cincinnati. Representative
10 Wenstrup lives in the western part of Cincinnati, so one could
11 modify that plan to place him in District 2 with no real impact
12 on anything other than the fact that one would be splitting
13 Cincinnati, which you could do now, but you cannot do in 2020
14 according to the ballot initiative that was adopted.

15 Q. Okay. Thank you. Could you please turn to tab 4 in the
16 binder in front of you. And for identification, this is P92.
17 Do you recognize this document?

18 A. Yes. This is a supplemental declaration that I prepared in
19 response to points raised by Dr. Hood in his expert report of
20 November 12th, 2018.

21 Q. And what were you asked to do with respect to the report
22 from Professor Hood?

23 A. Well, in his report Professor Hood had suggested that the
24 2012 plan was obviously drawn to protect incumbents, in most
25 instances, except that because the number of districts went

1 from 18 to 16, as he indicates in his report, the legislature
2 decided to pair two Democrats in one district, two Republicans
3 in one district, and then pair a Democrat and Republican in the
4 third district. And his suggestion was that the 2012 plan was
5 able to deal with 2011 incumbents, whereas the plaintiffs'
6 proposed remedial plan would have created havoc on the
7 incumbents and required massive changes in the underlying core
8 constituency for these various incumbents.

9 So the purpose of this particular declaration was just to
10 show that one could have drawn a plan very similar in many ways
11 to the proposed remedial plan that would have protected the
12 same number of incumbents as the 2012 plan did for the 2011
13 incumbents, and at the same time split just 14 counties with
14 compactness scores that were about the same as the proposed
15 remedial plan, and political fairness scores that were very
16 similar as well. So a plan could have been developed much like
17 the proposed remedial plan, but overlaid onto the 2011
18 incumbents. So there were differences.

19 Q. How did you come to have the addresses for the 2011
20 incumbents?

21 A. I obtained, from the plaintiffs' attorneys, a geographic
22 shapefile that had already been produced by defendants as part
23 of discovery, it's my understanding. And it was actually
24 something that I could immediately pop up on the screen showing
25 the points where all the incumbents lived, and so I started

1 with that file and assumed it was correct.

2 I did notice that Congressman LaTourette, who represented
3 District 14 at the time, was sort of put on top of the state
4 line between Ashtabula and Pennsylvania. I think I may have
5 looked at the address at some point and discovered that, in
6 fact, he lived somewhere else. And I then changed his address
7 to the zip code, which placed him in Lake County.

8 And it turns out that that was also wrong. I learned about
9 that a couple days later. We got an updated address, again,
10 through the plaintiffs' attorneys, where I learned that he
11 lived in Bainbridge Township in Geauga County. So I then had
12 to prepare another plan that took into account that change of
13 address.

14 Q. Well, and were the addresses for the 2011 incumbents that
15 you were attempting to geocode provided for you in the
16 materials with Dr. Hood's report?

17 A. No, there was no information in Dr. Hood's report about
18 where the 2011 incumbents lived. And this was retrospective.
19 There would really be no reason, necessarily, to take any of
20 that information into account in developing a prospective 2012
21 proposed remedial plan. But in order to address his concerns,
22 I felt like we had to, and we did not have his address
23 information, assuming he had had it.

24 Q. And so if you'll please turn with me to tab 5 in your
25 binder. And for identification, this is P93.

1 Do you recognize this document?

2 A. I do.

3 Q. And is this the correction that you just referred to?

4 A. Yes. This corrects what I had referred to as Hypothetical
5 Plan 1 and Hypothetical Plan 2. So this makes the address
6 corrections and so the two plans now that are corrected are
7 Hypothetical Plan 1A and Hypothetical Plan 2A.

8 Q. And when was this declaration executed?

9 A. I think the day after the other plans were -- were
10 submitted, a day or two after.

11 Q. What did you do to create the hypothetical maps that are
12 presented in this declaration P93?

13 A. Well, I, in large part, took the 2012 proposed remedial --
14 well, our proposed remedial plan and just began to make
15 modifications to fit it into the geographic dispersion of the
16 2011 incumbents. And so I made changes in order to protect all
17 incumbents except for three pairs as the state legislature had
18 done at the time. In other words, two incumbents who were
19 Republicans were paired.

20 I ended up pairing the same two, Representative Turner and
21 Austria, and the hypothetical plans, they are in seven. In my
22 first Hypothetical 1 Plan or 1A, I paired Representative Fudge
23 and Representative Kucinich, both of who live in Cleveland in
24 District 11, and I paired Representative LaTourette and
25 Representative Ryan in District 14.

MS. LEE: And if we could put up P93 at page five,
Figure 3.

Q. Are these the incumbent pairings to which you were just
referring?

A. Yes. And then on the other side you see the pairings that
were actually adopted as part of the 2012 plan and where
Representative Kaptur and Kucinich were placed in District 9,
and Turner and Austria were in 7, and Renacci and Sutton were
in District 16, I think it is under the -- under the 2012 plan.

Q. Yes. And then you had mentioned there were two
hypothetical plans in this report.

MS. LEE: If we could go to P93 page 13, Figure 8.

Q. And are these the pairs of incumbents that you did under
your second hypothetical plan?

A. Yes. In this instance, I paired Kaptur and Kucinich in
District -- of -- was it Figure 8?

Q. Yeah, Figure 8. Hypothetical Plan 2A on the 2012 plan.

A. Oh, I'm sorry. I paired Sutton and Kucinich in District 13
in that instance, and previously I had paired Kaptur and
Representative Fudge in District 11. Hypothetical 1.

Q. Sorry. Just to clarify. Representative Kucinich and
Representative Fudge?

A. Kucinich and Sutton.

Q. In 2A. And in --

A. In 1A it was Kucinich and Fudge.

1 Q. Okay. And so in creating these hypothetical maps you --
2 one district -- one of the paired districts featured two
3 Republicans; one, two Democrats; and the last a Democrat and a
4 Republican; is that correct?

5 A. That's correct.

6 Q. Okay. In drawing both these hypothetical plans and sort of
7 all of the plans you draw, do you always follow traditional
8 redistricting principles?

9 A. I did. These plans, again, split the same number of
10 counties, just 14. I think these plans split 34 political
11 subdivisions as opposed to 27. So there are a few more
12 subdivision splits, but still far less than is found in the
13 2012 plan. And moreover, perhaps most importantly, the
14 percentage of -- the mean average percentage of constituents
15 that are paired with their original incumbents, which is shown
16 in Figure 9, the core retention comparison showed that.

17 Q. Sorry. You're looking at page 14, Figure 9?

18 A. Yeah. Shows that there's virtually no difference, that the
19 plan that I prepared would have been as good in terms of core
20 retention as the 2012 plan. And, in fact, really, in a way, it
21 was even superior because Representative Kucinich was paired in
22 Hypothetical Plan 1A with Representative Fudge, but he actually
23 lived only about a mile away from -- from District 10 that has
24 no incumbent. So he could have run in that district without
25 a -- without another incumbent in that district.

1 So, in effect, the Hypothetical 1A Plan has just two paired
2 incumbents, two Democrats, two Republicans. And Kucinich, even
3 though he was paired against Fudge, could easily have run in
4 District 10 without another incumbent and he would have had
5 almost 50 percent of his constituents in that District 10 --
6 49.9 percent I think.

7 Q. And because Representative Kucinich drew the short straw
8 under both of your hypothetical plans, under either plan he
9 could have run in the empty District 10; is that correct?

10 A. Right. And really just by shifting about a dozen
11 precincts, he could have been placed in District 10 in, say, a
12 Hypothetical Plan 3. The only -- the only reason for pairing
13 him against either Fudge or -- or Sutton was to achieve the
14 same combinations as the 2012 plan. There really was no need
15 to pair three incumbents. You could have -- three sets of
16 incumbents. You could have reduced it to two.

17 Q. And would you ever have paired the same exact incumbents as
18 the -- in the 2012 plan as opposed to incumbent pairings by
19 political party breakdown as described by Dr. Hood?

20 A. No, it makes no sense. Because Kaptur lives in Lucas
21 County, Toledo, and Kucinich was in Cleveland, so it made no
22 sense to create a Snake on the Lake just to pair those two
23 incumbents. It just baffles me as to why that was done. If
24 there was a non-partisan reason for it, I would like to know.

25 Q. And did you in this report compare the hypothetical maps to

1 the 2012 plan?

2 A. Yes. In terms of compactness and core retention and
3 splits, all of these tables in this declaration show those
4 differences.

5 Q. Okay. And if you'll please turn with me to tab 6 of the
6 binder in front of you. And for identification, this is P598.
7 Do you recognize this document?

8 A. I do.

9 Q. And what is this?

10 A. This was a final declaration that I prepared that simply
11 added in the 2018 election results that, obviously, weren't
12 available to me when I filed the declaration in October. So I
13 just take the tables I had produced comparing the proposed plan
14 and the hypothetical plans that had just broken out 2012, 2014
15 and 2016 and added the 2018 results.

16 Q. So if you could turn to Figure 1 on page three of this
17 declaration. And so what is depicted here?

18 A. This shows the proposed plan versus the 2012 plan for all
19 four election years.

20 Q. And are the percentages for 2018 which are added in the
21 supplemental declaration compiled in the same way as you did
22 for 2012, 2014 and 2016?

23 A. Yes. I just aggregated precinct level information down to
24 the block level and then back up to the congressional district
25 level.

1 Q. Okay. And if we turn to Figure 2 on page four of this
2 declaration, are these those same results for the proposed
3 remedial plan corrected with the correction related to
4 Congressman Jordan's address?

5 A. Yes. So the only difference would be involving District 4
6 and District 8, which are very minor, tenths of a percentage
7 point differences.

8 Q. And did you provide the 2018 congressional results for both
9 the Hypothetical Plan 1A and 2A also in this declaration?

10 A. Yes. That would be in Figures 3 and 4.

11 Q. And in these figures are the results for 2012 to 2016 the
12 same as in your earlier reports?

13 A. Yes.

14 Q. Okay. And so the only addition here is the 2018 election
15 results?

16 A. Just for informational purposes, showing the 2018 results.

17 Q. Okay, great. Thank you.

18 And so I'd just like to flip back to an additional matter
19 that you were asked to look at by the plaintiffs' counsel. If
20 you turn back to your original declaration, which is at tab 1,
21 and the last section of this report.

22 A. Yes.

23 Q. And so in Figure 9 what were you asked to do?

24 A. I was asked to compile election results for what was called
25 House Bill 319 in order to compare those results with the 2012

1 plan, and also to analyze the number of split counties in the
2 House Bill 319 plan.

3 And House Bill 319 split more counties, split 29 counties,
4 as opposed to what was House Bill 369 that became the 2012 plan
5 that split just 23 counties. So that was an improvement.

6 If you look at the election data in terms of partisan
7 performance, there's really not very much difference in the two
8 plans, but it did improve in terms of county splits and
9 political subdivision splits.

10 Q. And so if we go to the last exhibit in the initial
11 appendix, Exhibit "I" in P454, which is tab 2 of your binder --

12 A. Yes. Yes, I have that.

13 Q. And does Exhibit "I" just provide those election results
14 showing the difference, the partisan difference between HB 319
15 and the 2012 plan as we just discussed?

16 A. Yes, for all state elections.

17 Q. Okay.

18 A. For 2008 and 2010.

19 Q. Okay. When you create a districting plan, is there a
20 certain type of file that you create once the plan is set which
21 would allow someone to open the plan exactly as it is?

22 A. Yes. I produce what is known as a block equivalency file
23 that just lists every census block in the state -- there are
24 200-and-some thousand, I think -- and identifies what district
25 that particular block is in so that someone could take that

1 and, within a matter of a minute or so, have it up on screen if
2 they have GIS software.

3 Q. Does a bit over 365,000 census blocks sound right for Ohio?

4 A. I think that's probably right. I said 200-and-some
5 thousand, but it's 365. Okay.

6 Q. Okay. And for each of the maps we've discussed in this
7 case did you create a block equivalency file?

8 A. Yes, for all four of the plans that are in this binder, the
9 proposed remedial plan and the two hypothetical plans, and then
10 the two corrections for the hypothetical plans, as well as a
11 corrected proposed remedial plan.

12 MS. LEE: As there are some maintained objections on
13 these block equivalency files, I just want to -- they're boring
14 to see -- but quickly walk through foundation with the expert.

15 So if we could please display P455.

16 Q. This is a document which is entitled "Proposed, underscore,
17 Remedial, underscore, Plan, dot, DBF" which was submitted along
18 with your original declaration and is dated October 5th, 2018.

19 A. Yes.

20 Q. Do you recognize this document?

21 MS. LEE: And if we could scroll to the bottom so we
22 could see the size.

23 A. Yes. This is just a block equivalency file.

24 Q. All right. And does this appear to be the block
25 equivalency file for the original proposed remedial plan?

1 A. Yes.

2 MS. LEE: Plaintiffs would like to move P455 into
3 evidence.

4 JUDGE BLACK: Any objection?

5 MR. McKNIGHT: No objection.

6 JUDGE BLACK: It's admitted.

7 (Plaintiffs' Exhibit 455 was admitted.)

8 Q. Okay. Now I'd like to show P466. The native title of this
9 document is "Hypo 1A, dot, DBF," which is dated November 27th,
10 2018, the same day as your correction report for the
11 hypothetical plans.

12 Do you recognize this document?

13 A. It's bound to be the block equivalency file. There are
14 350-some thousand blocks. So I can't really say I recognize
15 it, but I know by the name of the file and the date that this
16 is the Hypothetical 1A block equivalency file.

17 MS. LEE: Okay. And plaintiffs move Exhibit P466 into
18 evidence.

19 JUDGE BLACK: Any objection?

20 MR. McKNIGHT: No objection, Your Honor.

21 JUDGE BLACK: It's admitted.

22 (Plaintiffs' Exhibit 466 was admitted.)

23 Q. And now I'd like to show Plaintiffs' P467, which is a
24 document entitled, native file title, "Hypo 2A, dot, DBF," also
25 dated November 27th, 2018, and was submitted along with that

1 same corrected hypothetical declaration.

2 To the extent you can from just seeing it here, do you
3 recognize this document?

4 A. I believe that to be the block equivalency file for Plan
5 2A, Hypothetical Plan 2A.

6 MS. LEE: Plaintiffs move P467 into evidence.

7 JUDGE BLACK: Any objection?

8 MR. McKNIGHT: No objection, Your Honor.

9 JUDGE BLACK: It's admitted.

10 (Plaintiffs' Exhibit 467 was admitted.)

11 Q. Finally, I would like to show you P469, which is a document
12 entitled "Nov 30, dot, DBF," which is dated the same date and
13 was submitted along with your declaration of November 30th,
14 2018, that presented the correction to the proposed remedial
15 plan.

16 A. Yes.

17 Q. Do you recognize this document?

18 A. Yes.

19 MS. LEE: Plaintiffs would like to move P469 into
20 evidence.

21 JUDGE BLACK: Any objection?

22 MR. McKNIGHT: No objection, Your Honor.

23 JUDGE BLACK: Thank you. It's admitted.

24 (Plaintiffs' Exhibit 469 was admitted.)

25 MS. LEE: I have no further questions at this time,

1 Your Honor.

2 JUDGE BLACK: Very well.

3 CROSS-EXAMINATION

4 BY MR. McKNIGHT:

5 Q. Good afternoon, Mr. Cooper. Good to see you again.

6 A. Good afternoon.

7 Q. You testified about your experience drawing maps for
8 various parties and jurisdictions a moment ago. You would
9 agree with me that when you draw a districting plan every VTD
10 you decide to include in or remove from that districting plan
11 has a political consequence, wouldn't you?

12 A. Well, I mean, you could -- you could move VTDs that are
13 essentially the same, so -- in terms of political preference or
14 partisanship. So it's conceivable that every one you move
15 doesn't really have an impact.

16 Q. Okay. But how many VTDs have you ever encountered that
17 were exactly tied between Democrats and Republicans?

18 A. I don't know, but it could happen for sure.

19 Q. That would be pretty rare?

20 A. I'm talking about percentage terms, not raw numbers, of
21 course.

22 Q. Okay.

23 A. Give or two take two or three percentage points.

24 Q. Okay.

25 A. But, frankly, in this particular instance I was really not

1 working with the VTDs as I was drawing the plans. I was
2 working with the political subdivisions primarily. Some VTDs I
3 did have to aggregate to, you know, meet "One person, one
4 vote," but I was mainly working with the 9,000 or so political
5 subdivisions in the state.

6 Q. But every one you decide to move generally is going to make
7 the district either more Democrat or less Democrat or more
8 Republican or less Republican; right?

9 A. Oh, generally there would be some difference. And I do
10 want to correct that. There are over 9,000 VTDs, but I think
11 there are only around 2,000 political subdivisions, just to
12 correct that.

13 Q. All right. Thank you. And based on your experience, would
14 you agree that some intent to gain political advantage is
15 inescapable whenever political bodies devise a districting
16 plan?

17 A. Probably. If it's a political body, there probably is that
18 lurking in the background, sure.

19 Q. And that intent will have at least some effect on the map
20 that's drawn; right?

21 A. True.

22 Q. And in drawing your hypothetical plans, you did not take
23 into account any request or preferences of members of the Ohio
24 General Assembly about how the district should be drawn, did
25 you?

1 A. I was not provided with that information, no.

2 Q. And you also did not take into account any request or
3 preferences of members of Ohio's congressional delegation in
4 drawing any of your hypothetical plans, did you?

5 A. I did not. I was not provided that information.

6 Q. And you also did not consider any comments submitted by any
7 members of the public before the 2012 plan was enacted as to
8 how the public wanted the districts drawn, did you?

9 A. Again, I was not given that information if it exists.

10 Q. And you didn't consider boundaries of census tracks in
11 drawing your proposed remedial plan in this case, did you?

12 A. Not -- you know, I probably did early on look at census
13 tracks, but I was mainly working with municipal boundaries and
14 townships and, to a limited extent, precinct boundaries.

15 Q. All right. And that brings me to my next question, then.
16 In Ohio records of how precincts or VTDs vote are publicly
17 available, aren't they?

18 A. Generally speaking, I think you could get that information
19 for any election from the Ohio Secretary of State Web site.

20 Q. All right. And you use that publicly available data to
21 determine the vote share that each party received in
22 congressional elections over the course of multiple election
23 cycles; right?

24 A. Right.

25 Q. And in your reports you didn't use any election results

1 from before the 2012 election cycle to evaluate any of the
2 plans that you drew in this case, did you?

3 A. I had information for '08 and '10, but you may be correct
4 that that was not part of my report exhibit, no.

5 Q. All right. But you did evaluate the maps passed under
6 House Bill 319 and the map that's in place today, the 2012 plan
7 as you call it, under both the 2008 and 2010 election results,
8 didn't you?

9 A. Correct. I just presented the data, right.

10 Q. Okay. If you'll turn with me, then, to tab 1 in your
11 notebook, which is also Plaintiffs' Exhibit 90.

12 MR. McKNIGHT: If you want to put that up on the
13 screen for everybody.

14 Q. Plaintiffs' Exhibit 90 is the first declaration that you
15 submitted in this matter; is that right?

16 A. Yes.

17 Q. All right. And I want you to turn to Figure 9, which is
18 located on page 22. Are you there?

19 A. I'm looking at Figure 9 on screen.

20 Q. Okay. Well, if you want to turn in your book, that's fine
21 as well.

22 A. Yes.

23 Q. Okay. The percentages shown in Figure 9 are the percentage
24 of the two-party vote that Democratic candidates for Congress
25 received in each district during the 2008 and 2010 election

1 cycles; right?

2 A. Correct.

3 Q. And this chart shows that in the 2008 election cycle
4 Democrats received a majority of the vote share in six of
5 the -- I'm sorry, in seven of the 16 districts under the House
6 Bill 319 map; right?

7 A. I have to count them up. I think you're probably right,
8 but --

9 Q. And I can't --

10 A. Under the 2008 election?

11 Q. Yes, sir. I count District 3, District 6, District 7,
12 District 9, District 11, District 13 and District 16.

13 A. Okay.

14 Q. Is that seven?

15 A. I'll take your word for it.

16 Q. Okay. All right. And in the 2008 election cycle this
17 chart also shows that Democrats received a majority of the vote
18 share in seven of 16 districts under the 2012 plan that's
19 currently in place; right?

20 A. Yes.

21 Q. It's the same seven districts, isn't it?

22 A. Yes.

23 Q. Now, I think you testified earlier that your task in
24 drafting the remedial plan was to give Democratic voters a
25 better opportunity to elect their candidates of choice than

1 under the 2012 plan; is that right?

2 A. Correct.

3 Q. And in doing that you define Democratic voters as people
4 who cast ballots for Democrats; is that right?

5 A. In a head-to-head contest with a Republican, right.

6 Q. All right. And as you define it, people don't have to vote
7 for Democrats in every election to be considered a Democratic
8 voter; is that right?

9 A. Yeah. I'm looking at the overall vote for a Democratic
10 candidate. So the vote could have come from independents or
11 others who were not registered Democrats, exactly.

12 Q. All right. And in your reports you don't provide any kind
13 of threshold for how often a person must vote for Democrats to
14 be considered a Democratic voter, do you?

15 A. No. I'm looking at the final results.

16 Q. And you cannot quantify how much better of an opportunity
17 Democratic voters, as you have defined them, would have to
18 elect their candidates of choice under your proposed remedial
19 plan as compared to the 2012 plan, can you?

20 A. Could you repeat that.

21 Q. Sure. You can't quantify how much better of an opportunity
22 Democratic voters would have to elect their candidates of
23 choice under your proposed remedial plan as compared to the
24 2012 plan?

25 A. Well, I think you can by looking at the span of election

1 years, '08, '10, '12, '14, '16 and '18, and you could see that
2 that the prepared remedial plan leads to a better outcome for
3 the Democratic candidates.

4 Q. And when you say a better outcome, what do you mean?

5 A. More competitive districts and districts that would
6 theoretically elect a Democrat as opposed to a Republican.

7 Q. All right. And when you say a competitive district, how do
8 you define that?

9 A. I have used a self-imposed range of 47.5 to 52.5. I
10 understand a political scientist would have a different
11 measure. I'm not a political scientist. But as I was driving
12 the plan, the proposed remedial plan, and comparing and
13 contrasting that with the 2012 plan, I felt that like that five
14 percentage point range was reasonable in terms of assessing
15 whether a district was competitive or not. In other words, if
16 a district had 48 percent Democratic vote, I would have
17 considered that to be a competitive district even though it
18 would have still, at least theoretically, been won by a
19 Republican.

20 Q. All right. And in trying to give Democratic voters a
21 better opportunity to elect their candidates of choice, in some
22 instances Democratic voters could be shifted into a Republican
23 district; is that right?

24 A. That's true. And I was also, of course, taking into
25 account traditional redistricting principles, which I would

1 argue the 2012 plan does not do, setting aside any partisan
2 performance.

3 Q. And isn't it true that in making some districts more
4 competitive for Democrats under your proposed plan, you also
5 made other districts less competitive than they were under the
6 2012 plan?

7 A. That could happen, correct.

8 Q. Now I want to turn next to tab 6 in the notebook that you
9 have in front of you, and that's Plaintiffs' Exhibit 598.

10 Now, on direct I think you testified that this declaration
11 contains four charts with election results that were included
12 in your prior declarations but updated to include results from
13 the 2008 election cycle; is that right?

14 A. The 2018 election cycle.

15 Q. 2018, you're correct. Thank you.

16 So the first chart that I want to call your attention to is
17 Figure 1, which is on page three of that exhibit.

18 A. Yes.

19 Q. And this figure is the same as Figure 8 in your October 5th
20 declaration, which is your original declaration in this case,
21 except that it includes 2018 election results; is that right?

22 A. That is correct.

23 Q. All right. And so any testimony that you previously gave
24 in your deposition about Figure 8 in your October 5th
25 declaration would still be true today, at least as it relates

1 to the 2012, 2014 and 2016 election cycles?

2 A. I think so.

3 Q. All right. In looking at the election results you provided
4 from the 2012 elections, Democrats would have received a
5 majority of the vote share in Districts 3, 9, 11 and 13 under
6 both your proposed plan and under the 2012 plan; is that right?

7 A. Right, with a couple of competitive districts.

8 Q. All right. And then --

9 MS. LEE: Excuse me, Your Honors.

10 JUDGE BLACK: Yes.

11 MS. LEE: Mr. McKnight neglected to mention District
12 16 in the column he just read.

13 MR. McKNIGHT: Well, with all due respect, the
14 question was what districts would Democrats have won under both
15 the 2012 plan and under the proposed plan, and it's only those
16 four districts.

17 JUDGE BLACK: The record will reflect what it
18 reflects. Please proceed.

19 Q. And in looking at the 2014 election results, it appears
20 that Democrats would have received a majority of the vote share
21 under the same four districts as under both your proposed plan
22 and the 2012 plan; is that right?

23 A. That's correct. But it's important to point out that there
24 are additional districts that would be considered competitive.
25 For example, District 16 under the proposed plan would be 48.5

1 percent Democratic, versus 36.2 percent in the 2012 plan.

2 Q. All right. And under the 2016 election results it appears
3 to me that Democrats would have won or would have had a
4 majority of the vote share under both your proposed plan and
5 the 2012 plan in the same four districts: 3, 9, 11 and 13. Do
6 you see that?

7 A. And 16.

8 Q. Well, that's another district that they might have had a
9 majority in under your proposed plan, right. But I'm talking
10 about districts that Democrats won under both plans. It's the
11 same --

12 JUDGE BLACK: Excuse me. We need to get this
13 clarified. Counsel for the plaintiffs has stood.

14 MS. LEE: Just clarifying, Your Honor, District 9 is
15 not one of those districts. Misstating the contents of the
16 exhibit.

17 Q. Oh, I apologize. It's 3, 5, 11 and 13; and then 3, 9, 11
18 and 13 under the 2012 plan. Is that right?

19 JUDGE NELSON MOORE: This is going too fast. I think
20 we should start from the beginning.

21 MS. LEE: Okay.

22 JUDGE NELSON MOORE: Because I haven't been able to
23 follow your numbers at all.

24 MR. McKNIGHT: Okay. All right. Sure. Sure. Thank
25 you.

1 Q. So my question is, in comparing the election results under
2 the -- your proposed plan to the election results under the
3 2012 plan, it appears to me across the board, no matter what
4 election cycle it is, Democrats have a majority of the vote
5 share in District 3. Does that appear to be correct?

6 A. That is correct in all plans.

7 Q. Okay. And then looking at District 9, looking across the
8 board, it appears to me that Democrats had a majority of the
9 vote share across all plans there except in the years 2014 and
10 2016. Is that right?

11 A. Right. Of 2016, it would be a competitive district, 48.9
12 percent.

13 Q. And then if you look --

14 JUDGE NELSON MOORE: In 2014 it's 44.6; right? Am I
15 reading that right?

16 MR. McKNIGHT: Yes, Your Honor.

17 JUDGE NELSON MOORE: Thank you.

18 MR. McKNIGHT: Yes, Your Honor.

19 Q. In looking at District 11, when you look across the board
20 it appears to me that Democrats would have a majority of the
21 vote share in that district; it doesn't matter who drew the
22 plan. Right?

23 A. Correct.

24 Q. And then looking at District 13, it looks like the
25 Democrats would have majority of the vote share across the

1 board; it doesn't matter who drew the plan. Is that right?

2 A. That's correct.

3 Q. Now, the percentages in these charts that are reflected in
4 your reports, they are not intended to predict whether a
5 Democrat or Republican would have won any of those particular
6 districts; is that right?

7 A. No. This is -- you're correct in that it's simply stating
8 the vote share and is hypothetical, because obviously no one
9 was running in the proposed plan districts.

10 Q. All right. And as a result of the differences in the
11 districts, different candidates may have run under the
12 districts you drew as opposed to the districts that were
13 actually in place in 2012; is that right?

14 A. Potentially.

15 Q. Okay. And in addition to the proposed remedial plan, it's
16 also true that you can't say how many Democrats and how many
17 Republicans would have been elected in any election cycle under
18 any of the other maps you drew and included in any of your
19 reports; is that right?

20 A. Well, because these are hypothetical, theoretical plans,
21 obviously, I can't say with certainty that had the election
22 been held under those plans that they would have worked on
23 precisely the way you see in these charts, no, of course not.
24 This is indicative of what might have happened with some
25 historical evidence but by no means a predictor.

1 Q. Thank you.

2 Now, I want to make sure I understand what happened with
3 respect to your errata report that we talked about in your
4 direct examination.

5 Now, I think you testified that you issued your errata
6 report from your original declaration to fix an error that
7 would have paired Congressman Jim Jordan and Congressman Warren
8 Davidson; is that right?

9 A. Yes. Initially I had information that Congressman Jordan
10 lived in Lima as opposed to Urbana, so I did not include Urbana
11 and Champaign County in his District 4, so that's why that
12 correction was made.

13 Q. All right.

14 A. There was never any intention to pair him and Congressman
15 Davidson in the same district.

16 Q. Okay. Now, Congressman Davidson was not the incumbent when
17 the 2011 -- or 2012 plan was adopted; right?

18 A. I don't know.

19 Q. It was -- it was Speaker of the House John Boehner was
20 in --

21 A. Well, okay. Right.

22 Q. Is that right?

23 A. Right.

24 Q. Okay. So what would have happened under your original
25 proposed plan is that Congressman Jordan and Congressman

1 Boehner would have been paired; is that right?

2 A. Well, only because there was a mistake, because in my mind,
3 in the original proposed plan Congressman Jordan didn't live in
4 Urbana, he lived in Lima, so there would have been no pairing.
5 That would have cleared up somewhere along the line, as we have
6 done with the errata declaration that was filed in November.

7 Q. All right.

8 A. There was never any intention to pair Congressman Boehner
9 or Congressman Davidson with Representative Jordan.

10 Q. But it's fair to say that a plan that paired Speaker
11 Boehner with another incumbent would not have been adopted by
12 the Ohio General Assembly in 2011?

13 A. Probably not, although he would have been a very strong
14 candidate running against virtually any Democrat in that part
15 of the state. So that would have been a pretty safe pairing, I
16 would imagine.

17 Q. Okay. But in order to fix this issue you had to move
18 Champaign County and a part of Mercer County from District 8 to
19 District 4; is that right?

20 A. Right. It's really a nothing burger, to use an overused
21 term.

22 Q. I think that's a Southern term.

23 A. I've heard it a lot in recent months.

24 Q. All right. I know what you're talking about.

25 A. Okay.

1 Q. But the reason why it was a nothing burger, then, was
2 because even though you moved a whole county and then you had
3 to move portions of two other counties is because this is a
4 predominantly Republican area of the state; is that right?

5 A. That's true. It made it much easier to fix that mistake.

6 Q. All right.

7 A. Exactly.

8 Q. Now, we also talked about the supplemental reports you
9 submitted. And in those supplemental declarations you included
10 two hypothetical redistricting plans; is that right?

11 A. Right.

12 Q. And in doing that you consider the residences of the 2011
13 incumbents and you paired two Democratic incumbents, two
14 Republican incumbents, and one Democrat and one Republican
15 incumbent; is that right?

16 A. Yes.

17 Q. All right. But you did not pair the same incumbents who
18 were paired under the 2012 plan?

19 A. I'm not sure what you mean by that.

20 Q. Well, you didn't pair the same --

21 A. The only two incumbents that are paired in the 2012 plan
22 would be Representative Chabot and Wenstrup in District 1, and
23 that is only because of the ballot initiative. But, of course,
24 they weren't in place in 2011, so maybe your question is
25 directed in some other fashion, so go ahead.

1 Q. Yeah. So my question is, you didn't pair the same
2 individuals who were paired under the 2012 plan, did you? In
3 other words, the two Democratic incumbents you paired were
4 Representative Fudge and Representative Kucinich; right? And
5 they weren't paired under the 2012 plan, were they?

6 A. No. Under the 2012 plan, for whatever reason, Kucinich was
7 paired with Kaptur so that you had the Snake on the Lake
8 district from Toledo to Cleveland.

9 Q. Okay. And under your map you paired Representative Ryan
10 with Representative LaTourette; right?

11 A. I did.

12 Q. Okay. And in the 2012 plan Congressman Renacci was paired
13 with Congresswoman Sutton; right?

14 A. I think so.

15 Q. Okay. All right. And so you -- in none of your reports
16 did you pair the same individuals who were paired in the 2012
17 plans, did you?

18 A. No. I did not pair Renacci and Sutton, I do not believe.
19 I was mainly attempting just to come up with a plan that had
20 basically the same core retention rates as the 2012 plan.

21 Q. All right. And you never paired Kaptur and Kucinich
22 either?

23 A. No, but I know it can be done. The problem is that if you
24 do it, you're creating a district that does not adhere to
25 traditional redistricting principles. So, therefore, I did not

1 do that pairing.

2 Q. All right. And that was going to be my next question for
3 you, is why in any of the maps that you submitted in your
4 reports did you not try to pair the same individuals who were
5 paired in the 2012 plan?

6 A. Well, because I don't -- I don't think you can really
7 comply with traditional redistricting principles and create a
8 district that would have gone from Cleveland all the way up to
9 Toledo, splitting five districts, just to pair those two
10 incumbents. I mean, if you did, then you would have a district
11 that looked not unlike current District 9 under the 2012 plan
12 that I could not sign off on because it's not complying with
13 traditional redistricting principles, in my opinion.

14 Q. And would that pairing have affected the entire plan, in
15 your view?

16 A. You know, I suspect that I could have drawn that district
17 and still come up with similar retention rates. I don't know
18 that to be a fact, but it's probable. But I would not have
19 drawn the plan, because it makes no sense to draw a district
20 like that under any possible scenario that I can conjure up.

21 Q. But you never included a map like that in any of your
22 reports, did you?

23 A. Of course not, because I wanted to make sure that my plans
24 complied and adhered to traditional redistricting principles
25 and minimized county splits. In order to create the Snake on

1 the Lake district, you have to split several counties
2 unnecessarily.

3 Q. Now, do you remember when I asked you that question in your
4 deposition?

5 A. No. Not off the top of my head, no.

6 Q. Okay. So I take it you don't remember what your response
7 was?

8 A. I do not specifically remember my response, no.

9 MR. McKNIGHT: Okay. Could we pull up page 165 of Mr.
10 Cooper's deposition.

11 Q. And I want you to -- I'm going to read starting at line 10
12 the question and answers that we went through there, and I want
13 you to listen and tell me whether I read it correctly.

14 I asked you -- starting on line 10 I said: Thinking about
15 the incumbent pairings that you did in either of these
16 hypotheticals, did you ever draw a hypothetical plan pairing
17 the same incumbents as the 2012 plan?

18 And your answer was: Pairing the same incumbents as the
19 2012 plan -- and you're talking about the same incumbents, the
20 2011 incumbents?

21 And I said: That's right.

22 And you said: I don't think so.

23 And then I asked you: Why did you never try to do that?

24 And your response was: Because I might have ended up with
25 the 2012 plan. I don't know. I'm not sure -- I'm not sure why

1 that would matter.

2 Do you see that?

3 A. Yes.

4 Q. Did I read that correctly?

5 A. Provided the stenographer took it down word for word
6 correctly, I assume so. I don't really see how that
7 contradicts anything I've said today, but maybe I'm missing
8 something.

9 Q. Okay. Now I want to look at Figure 3, which is in your
10 third declaration, and that's on page five.

11 Now, below Figure 3 there's a footnote, and that footnote
12 says the district numbers in Hypothetical 1A and Hypothetical
13 2A are assigned to facilitate comparisons with the 2002 plan,
14 rather than the 2012 plan.

15 Do you see that?

16 A. Yes.

17 Q. And why did you decide to do that with these two
18 hypotheticals?

19 A. Well, because originally the Dayton area was in District 7,
20 and District 10 was in Cuyahoga County. So I put District 7
21 back in the Dayton area just so you could compare the two maps,
22 the 2002 and the hypothetical 2011 plan, 1A and 2A.

23 Q. Did you consider the 2002 plan to be the benchmark plan?

24 A. It was in the sense that that part of the state had a
25 District 7 at the time, yes.

1 Q. All right.

2 A. I don't think it really impacts anything other than just a
3 district numbering scheme.

4 Q. All right. Well, in thinking about the district numbers, I
5 also notice that the district that you have in Franklin County
6 in Hypotheticals 1A and 2A is now identified as District 15; is
7 that right?

8 A. I have to look at the map, but that's possible.

9 Q. Okay.

10 A. Yes, at least in Hypothetical Plan 2. And I'm sure in
11 Hypothetical Plan 2A District 15 is in Franklin County.

12 Q. Okay. And you did that with respect to both hypothetical
13 plans; right?

14 A. Yes.

15 Q. And looking in your proposed remedial plan, the district
16 that's contained entirely within Franklin County is known as
17 District 3; is that right?

18 A. Yes.

19 Q. Okay. Why did you decide to change that numbering?

20 A. I think at that point I was then working off of the 2012
21 plan, and in the current 2012 plan there is a District 3 in
22 Franklin County; right? Isn't that --

23 Q. That's my understanding, yes.

24 A. Yes, yes. So that's -- that's another one that was
25 actually -- where the numbers are somewhat different.

1 Q. Now, in your report, your testimony earlier today you
2 provided a comparison of the number of county and political
3 subdivision splits between your plans and the 2012 plan. But
4 you cannot provide a maximum number of acceptable county or
5 political subdivision splits for a congressional plan in Ohio,
6 can you?

7 A. A maximum number?

8 Q. Yes, sir.

9 A. You know, I can -- I can suggest that it would be better if
10 no more than 14 counties were split, as a maximum number. I
11 realize that's lower than what is allowed under Ballot
12 Initiative 1, but I think that's one way to ensure that plans
13 are drawn that comply with traditional redistricting
14 principles.

15 Q. All right. And do you remember when I asked you that
16 question in your deposition?

17 A. No. I must have had a different number. Go ahead and show
18 it to me.

19 Q. Okay. All right. Why don't we pull up, then, page 17 in
20 your deposition.

21 And looking at line 25, I think I asked you: And in your
22 opinion, is there an acceptable maximum number of county
23 splits?

24 And your response was: I don't know. That's not something
25 I would be able to opine on.

1 Do you see that?

2 A. Where is that, what line?

3 Q. It starts on line 25 of page 17.

4 A. Oh.

5 Yeah. Make that a little bigger, please.

6 Q. And the question, again, was: In your opinion, is there an
7 acceptable maximum number of county splits?

8 And your response was: I don't know. That's not something
9 I would be able to opine on.

10 Did I read that correctly?

11 A. Oh, you did. I just opined on it.

12 I'll stand on what I just opined on today rather than
13 saying I couldn't opine on it two months ago.

14 Q. And in terms of a maximum number of political subdivision
15 splits, is there a maximum number that you find would be
16 acceptable of those?

17 A. I haven't looked at my declaration on how I answered that,
18 but that would be a little more difficult to come up with a
19 maximum number.

20 Q. I think your opinion, at least in your deposition, was that
21 you could not give me a figure on that --

22 A. Yeah.

23 Q. -- if you look down the page.

24 A. Right.

25 Q. Now, when you were drawing the maps, you had election data

1 loaded into Maptitude; correct?

2 A. Some election data, right.

3 Q. Okay. And although you weren't constantly looking at it,
4 according to your testimony earlier, that data was available on
5 your screen, was it not?

6 A. I could reference it and access it, correct.

7 Q. And so --

8 A. Some of it. As I indicated, I did not have information for
9 2014 until the 2012 plan was really produced, so -- the
10 proposed remedial plan was really produced. So I was mainly
11 looking at 2012 and 2016 data.

12 Q. And so when a legislature is drawing a congressional plan,
13 is it appropriate for them to consider political data?

14 A. I think so. I mean, that's common practice.

15 Q. Now, are you aware that under your version of District 11,
16 and that's a district in Cuyahoga County, that district would
17 cease to be a majority-minority district for first time since
18 the 1960s?

19 A. I don't know that to be a fact, but I do know that it must
20 have been just barely above 50 percent in 2000. So it is now a
21 plurality minority district in the proposed remedial plan,
22 which, as I mentioned earlier today, was determined by
23 political scientist Dr. Lisa Handley to be a minority
24 opportunity district likely to elect a minority candidate of
25 choice. The district's 80 percent Democratic with

1 substantial -- I assume she probably suggested that there was
2 substantial white crossover vote. So it's not like creating a
3 47 percent district in Mississippi, for example, where that
4 would be problematic from the standpoint of minority voting
5 strength.

6 JUDGE BLACK: Stay close to that microphone, please.

7 THE WITNESS: Excuse me.

8 Q. And you don't know whether anyone in the Ohio General
9 Assembly supported drawing District 11 as a majority-minority
10 district, do you?

11 A. I don't have information about who supported that objective
12 and who did not.

13 Q. All right. And you didn't try to draw a plan locking in
14 District 11 as it appears in the 2012 plan, did you?

15 A. No. Because it's really problematic. The way Summit
16 County is sliced and diced, you know, if this were a Section 2
17 case, I'm just not sure that would pass muster with the court
18 in terms of whether it would be an acceptable shape for a
19 majority-minority district. It's not -- not too good. It's a
20 little irregular.

21 Q. But no one's brought such a claim, to your knowledge?

22 A. No. To my knowledge, in Ohio no one has brought a claim on
23 Congressional District 11 as it is presently drawn or as it was
24 drawn in the 2000s.

25 MR. McKNIGHT: All right. Thank you, sir. No further

1 questions from me.

2 CROSS-EXAMINATION

3 BY MR. TUCKER:

4 Q. Good afternoon, Mr. Cooper. Good to see you again.

5 A. Good to see you.

6 JUDGE WATSON: Are you both being somewhat
7 disingenuous when you're saying that?

8 MR. TUCKER: No, not at all.

9 JUDGE WATSON: I just wondered. Go ahead.

10 JUDGE BLACK: You checked the clock, no doubt.

11 MR. TUCKER: I checked the clock. We will be done
12 well before 5:00 o'clock, Your Honor.

13 JUDGE BLACK: It's a credit to you.

14 Q. Mr. Cooper, do you know who was the most tenured member of
15 the Ohio congressional delegation in 2011?

16 A. Well, I would say John Boehner, but perhaps I'm mistaken.
17 So you might enlighten me as to who the other one would have
18 been.

19 Q. Sure. If I told you that it was Congressman LaTourette,
20 would it be a reasonable goal for the Ohio legislature to want
21 to avoid pairing Congressman LaTourette with another incumbent
22 member of Congress?

23 A. Perhaps. But on the other hand, if you thought that
24 Congressman LaTourette could take out another incumbent member,
25 maybe that would make it a good pairing. I realize that I

1 paired LaTourette and Ryan in this hypothetical plan, but it is
2 just one of other possible hypothetical plans.

3 Q. And you answered my next question, was in both of your
4 hypothetical plans you paired Congressman LaTourette with
5 Congressman Ryan; correct?

6 A. Yeah. That would have been a real dogfight, I guess.
7 Right?

8 Q. Mr. Cooper, do you consider yourself a Democrat?

9 A. No, I'm not a Democrat. I'm not registered as a Democrat.

10 Q. Have you ever drawn any plans for any Democrats? Or I'm
11 sorry. For any Republicans.

12 A. Yes. I've drawn plans for jurisdictions in Mississippi
13 that would have been Republican districts or Republican city
14 councils, for example.

15 I'm working on behalf of the City of Decatur, Alabama,
16 which has one minority on city council, out of five. And I
17 don't know for a fact, but I'm assuming that individual is a
18 Democrat, but probably at least three of the others are
19 Republicans. It's north Alabama. It's most likely a
20 Republican city council.

21 Q. Have you ever drawn any plans for any Republicans in a
22 partisan gerrymandering case?

23 A. No, because I've really only been involved in the three
24 partisan gerrymandering cases that I mentioned previously.

25 Q. Now, I understand that you testified earlier that you could

1 not see why the Ohio legislature would draw a map that paired
2 Congressman Kucinich with Congressman Kaptur. Is that correct?

3 A. I could not see why, but maybe you could enlighten us
4 today.

5 Q. Well, I want to pull up one of the exhibits to your report.
6 And do you recognize this map, sir?

7 A. Yes. This is the 2012 plan.

8 Q. And on this map you have both some blue dots and some red
9 dots. Can you describe what those are?

10 A. Yes. The blue dots represent Democrats, and the red dots
11 represent Republican congresspersons.

12 Q. And specifically if you could describe, there's a blue dot
13 right in the middle of the word "Cuyahoga." Do you see that
14 one?

15 A. Yes. That would be Representative Kucinich.

16 Q. And the blue dot below to the right of that, would that be
17 Representative Fudge?

18 A. Right.

19 Q. And the blue dot over by Lucas County, is that
20 Representative Kaptur?

21 A. Right.

22 Q. And then the blue dot in Trumbull County is Representative
23 Ryan; is that correct?

24 A. Yes.

25 Q. Now, I want you to start from the premise that if you were

1 drawing a map and somebody gave you the -- well, strike that.

2 Let me wind back.

3 Ohio is losing two congressional seats following the 2010

4 Census; correct?

5 A. Yes.

6 Q. It was going from 18 seats to 16 seats?

7 A. Right.

8 Q. So two incumbent members of Congress were no longer going
9 to have their seat after the redistricting; is that correct?

10 A. Correct.

11 Q. At least two?

12 A. At least two.

13 Q. Now, I want you to start with the premise that if somebody
14 asks you to draw a map with two different goals, the first goal
15 was with the loss of two seats you're going to pair two
16 Democrat incumbents and two Republican incumbents -- okay? --
17 and with the second premise being that you have a request to
18 protect Congresswoman Fudge and not pair her with another
19 member of Congress, including Congressman Kucinich. Okay?

20 A. I question that premise, but go ahead.

21 Q. I understand that. But with that premise, would that be a
22 reasonable reason why you would draw a district that would pair
23 Congressman Kucinich and Congressman Kaptur, given the location
24 and residences of the Democratic members of Congress that
25 existed in 2011?

1 A. Not really, because I've shown in Hypothetical Plan 2A that
2 Kucinich could have been paired with Sutton rather than with
3 Kaptur.

4 Q. Okay. Well, assuming, then, that Representative Sutton and
5 Renacci, as we know happened in the enacted map, were paired,
6 is there any other way that you would pair two Democratic
7 members of Congress other than pairing Representative Kucinich
8 and Representative Kaptur?

9 A. Well, maybe I -- maybe I'm missing something, but I was
10 able to pair Kucinich and Sutton in Hypothetical Plan 2A. So
11 there was another way to do it without involving Representative
12 Kaptur.

13 Q. Well, if Representative Sutton and Representative Renacci,
14 who live --

15 I believe those are the blue and the red dots down by
16 Medina and Summit County; correct?

17 A. Yeah. Medina County would have been Renacci.

18 Q. So if there's already a pairing down there, would it have
19 been reasonable, if you're still trying to pair two Democratic
20 members of Congress together under the goal of two Democrat
21 paired, two Republicans paired, to pair Representative Kaptur
22 and Representative Kucinich in that -- under that premise?

23 A. Well, you know, again, I just don't -- do not think that
24 you can comply with traditional redistrict principles and pair
25 anyone in Cuyahoga County with someone in Lucas County in

1 Toledo. I just -- you've created this long stringy district
2 that splits three or four counties. I just -- it makes no
3 sense. There's got to be other ways to accomplish that, and
4 I've shown you two ways.

5 Now, it's true that I've paired Representative Kucinich
6 with Representative Fudge in Plan 1A, but the point that I've
7 tried to make was that Kucinich could very easily have run in
8 the neighboring district, which had no incumbent. So you're
9 not required to live in the district as a congressperson, so
10 you could -- he could have run in the neighboring district by
11 just either moving two miles or simply running in the district
12 even though he didn't really live in it. I don't -- I don't
13 think it would have been necessary to assume that he would have
14 run against Representative Fudge.

15 Q. Sure. Let me ask it this way, I guess. If there's a goal
16 of not pairing Representative Kucinich with Representative
17 Fudge and Representative Renacci and Sutton have already been
18 paired together, would it have made more sense to pair
19 Representative Kucinich with Representative Ryan all the way in
20 Trumbull County?

21 A. It would have been just as odd and probably not any way to
22 do that and comply with traditional redistricting principles.

23 MR. TUCKER: Thank you, sir. No further questions.

24 JUDGE BLACK: Redirect, if any?

25 MS. LEE: Just one, I think, Your Honor.

1 JUDGE BLACK: One question?

2 MS. LEE: I think one to set it up, and then the
3 actual question.

4 JUDGE BLACK: Two questions.

5 REDIRECT EXAMINATION

6 BY MS. LEE:

7 Q. Do you recall -- you were just asked about your deposition
8 and whether you would have paired Representatives Kaptur and
9 Kucinich?

10 A. Yes.

11 Q. Do you recall that you were asked that at an earlier point
12 in your deposition as well, that you were shown?

13 A. No. No, I fail to recall that.

14 MS. LEE: Could you please put up page 152 of Mr.
15 Cooper's deposition, beginning at line 12.

16 Q. And, Mr. Cooper, could you please read lines 12 through 22.
17 Why don't you take it to the whole page. Out loud.

18 A. Oh. Read starting on --

19 Q. Page 152 --

20 A. Yeah.

21 Q. -- line 12.

22 A. Oh, okay. Well, I'm asking his question, then.

23 In looking at the incumbents you paired in Hypothetical 1A,
24 comparing them to the incumbents that were paired in the 2012
25 plan, why did you not pair the same incumbents as in the 2012

1 plan?

2 And my answer was: Well, to pair Kaptur and Kucinich, as
3 is done in the 2012 plan, you have to draw the "Snake on the
4 Lake." You have to combine Toledo with Cleveland in that
5 elongated district. So you're breaking traditional
6 redistricting principles, I think, in terms of compactness and
7 communities of interest. That's what I think. So it's a
8 mistake to try to pair two incumbents -- to pair two Democratic
9 incumbents who live that far apart when it would have been very
10 easy to draw a plan, as I've drawn in Hypothetical 1A and 1B,
11 that would have not paired -- well, 1B, I guess, reconfigures
12 11. But in this particular version 1A, there's no reason to
13 think that Kucinich would just -- he would have probably run in
14 a District 10 configured the way it's drawn in Hypothetical
15 Plan 1A.

16 JUDGE BLACK: All right. Intervenors' counsel is
17 standing.

18 MR. TUCKER: Yes, Your Honor. We object to this
19 question and answer, that the witness is just reading from his
20 deposition transcript. It's not a proper way to refresh a
21 witness' recollection. Thank you.

22 JUDGE BLACK: The objection's noted.

23 Q. So do you recall having explained the further details of
24 why you did not pair Representatives Kaptur and Kucinich at
25 your deposition, earlier than the time Mr. McKnight night just

1 presented to you?

2 A. Well, now that you've presented it to me and I sort of --
3 maybe I'm confusing what I recently said, but I think what I've
4 already said today is sort of consistent with what I said at
5 this point in the deposition.

6 Q. Yes.

7 A. I realize it was kind of rambling and lots of sentence
8 fragments and garbled syntax, but basically it's the same
9 thing, isn't it?

10 MS. LEE: No further questions, Your Honor.

11 JUDGE BLACK: Very well.

12 You appear to have survived.

13 THE WITNESS: Well, maybe.

14 JUDGE BLACK: You are welcome to step down.

15 THE WITNESS: Thank you.

16 (Witness excused.)

17 JUDGE BLACK: And it's about quarter of 5:00.

18 Presumably we should break for the day. Is that the
19 plaintiffs' perspective?

20 MS. LEVINSON: At your pleasure, Judge.

21 JUDGE BLACK: I think we should break today at this
22 time. I mean, you're not going to get a witness on and off in
23 15 minutes, are you?

24 MS. LEVINSON: Well, we could get him on but not off.

25 JUDGE BLACK: All right.

1 MR. FRAM: We can get him up there.

2 (Judges confer privately.)

3 JUDGE BLACK: It's unanimous: We're breaking. It's
4 quarter of 5:00. You guys have been at it and it's been dense
5 but important. I'm going to enjoy the break. I hope you do as
6 well.

7 The Court prepares to recess till 9:00 o'clock tomorrow.

8 COURTROOM DEPUTY: All rise. This court is now in
9 recess.

10 (At 4:43 PM, the trial was recessed, to be continued on
11 Thursday, March 7, 2019, at 9:00 AM.)

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C E R T I F I C A T E

I, Luke T. Lavin, RDR, CRR, the undersigned, certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter.

s/Luke T. Lavin
Luke T. Lavin
Official Court Reporter

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